

JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL.

VOL. LXXV.

LIBRARY
NEW YORK
BOTANICAL
GARDEN.

Materials for a Flora of the Malayan Peninsula No. 22.—By J. SYKES
GAMBLE, C.I.E., M.A., F.R.S., *late of the Indian Forest
Department.*

FOUR volumes of this work, in 21 Parts, have already appeared, the first three containing the Thalamifloræ, Discifloræ and Calycifloræ, by Sir George King, K.C.I.E., LL.D., F.R.S.; the fourth containing Gamopetalæ by Sir George King and Mr. J. S. Gamble. The first two volumes were entirely Sir George King's own work; in the third volume the large Family of *Leguminosæ* was done by Lt.-Col. D. Prain, at that time Curator of the Herbarium, Royal Botanic Garden, Calcutta, the genus *Sonerila* in *Melastomaceæ* by Dr. O. Stapf of Kew, and the rest by Sir G. King. In the fourth volume, Lt.-Col. Prain also did *Convolvulaceæ*, *Solanaceæ*, *Scrophulariaceæ*, *Labiataæ* and a few other Families; the *Acanthaceæ* were done by the late Mr. C. B. Clarke, F.R.S.; and the *Gesneraceæ* were compiled from Mr. H. N. Ridley's work on that Family in the Journal of the Straits Branch of the Royal Asiatic Society. The other Families were done by either Sir G. King or Mr. Gamble.

The section of the 'Materials' dealing with the Monocotyledons appeared in 1907-8. It was a separate publication entitled "Materials for a Flora of the Malay Peninsula—Monocotyledons, by H. N. Ridley, M.A., F.R.S., etc., Director of Botanic Gardens, Singapore, S.S. (Methodist Publishing House, Singapore)," and really forms the concluding portion of this work.

This number is the first of Vol. V, which is intended to contain the Monochlamydeæ and the Gymnosperms; and, owing to the sad occurrence of the death of Sir George King which took place almost

MAY 2 - 1913

on the very day that Part 21—the last one of Vol. IV—appeared, Mr. Gamble is alone responsible for it. He has been promised help by various Botanists, and especially by Major A. T. Gage, I.M.S., the present Superintendent of the Royal Botanic Garden, Calcutta; and hopes that with this kind assistance the whole work may soon be fully completed.

The present contribution contains the account of the Families No. 93 Nyctaginaceæ, No. 94 Amarantaceæ, No. 95 Polygonaceæ, No. 97 Aristolochiaceæ, No. 99 Chloranthaceæ, No. 102 Lauraceæ and No. 103 Hernandiaceæ, all the work of Mr. Gamble except No. 95 Polygonaceæ which has been contributed by Major Gage. The seven Families dealt with contain 33 genera and 189 species, of which 1 genus and 78 species were new. The new species have been published in the Kew Bulletin.

In accordance with the Rules adopted by the Vienna Conference, the measurements in this volume will be given in the metric system; and it is hoped that this change will not prove an inconvenience.

Family XCIII.—NYCTAGINACEÆ.

Herbs, shrubs or trees. *Leaves* usually opposite, entire; stipules 0. *Flowers* hermaphrodite (rarely unisexual), regular, sometimes dimorphous; inflorescence various, the flowers often involucrate. *Perianth* monopetalous, petaloid, usually small; tube persistent, enveloping the fruit; limb 3—5-lobed, persistent or deciduous, the lobes plicate in bud. *Stamens* 1 to 30, hypogynous, sometimes unilateral; filaments usually unequal, inflexed in bud; anthers included or exserted, dorsifixed, didymous. *Ovary* free, 1-celled; ovule solitary, basal, erect; style filiform, involute in bud; stigma small. *Fruit* indehiscent, enclosed in the hardened perianth-tube. *Seed* erect; testa thin, adherent; albumen soft or floury; embryo with convolute or incurved cotyledons; radicle inferior.—**DISTRIB.** Genera about 22, species about 220, in tropical and warm regions.

1. BOERHAAVIA, Linn.

Herbs, erect or diffuse, often divaricately branched. *Leaves* opposite, often in unequal pairs. *Flowers* small, paniculate, umbellate or subcapitate, articulated with the pedicel; bracteoles small, often deciduous, rarely involucrate. *Perianth*-tube long or short, ovoid below, narrowed above the ovary; limb funnel-shaped or campanulate, 5-lobed. *Stamens* 1—5, connate below around the ovary,

exserted; filaments capillary, unequal. *Ovary* oblique, stipitate; ovule erect; stigma peltate. *Fruit* small, enclosed in the ovoid, turbinate or clavate, truncate, ribbed or angled, viscidly glandular perianth-tube; embryo conduplicate; cotyledons thin, broad, the outer the larger, enclosing the soft floury albumen; radicle long.—**DISTRIB.** About 30 species, tropical and subtropical.

BOERHAAVIA DIFFUSA, Linn. Sp. Pl. 3 (1753). A diffuse herb; root fusiform, stout; stems prostrate or ascending, divaricate, thickened at the nodes. *Leaves* opposite, in unequal pairs, ovate or orbicular-ovate, rounded or acute at apex, truncate or cordate or rounded only at base; upper surface rough, lower whitish scaly; larger one of each pair 2—3 cm. long, 1—2 cm. broad, smaller half the size or less; main nerves 3—5 pairs, spreading, the lowest pair near the base; petiole slender, variable in length, up to 2 cm. long. *Flowers* in subcapitate heads, in divaricate slender dichotomously branched terminal panicles; pedicels capillary; bracts small, lanceolate, acute. *Perianth* about 2 mm. long, the lower part of the tube about equalling the upper, the lower glandular enclosing the ovary, the upper glandular, dotted with red in 5 vertical bands, campanulate; lobes 5. *Stamens* 2, slightly exserted; the anthers glandular on the back. *Fruit* about 3 mm. long, obovate truncate, 5-ribbed and glandular. **BL.** Bijdr. 733; Choisy in DC. Prod. XIII. 2. 452; Wall. Cat. 6770; Trimen Fl. Ceyl. III. 390; Cooke Bomb. Fl. II. 480. *B. procumbens*, Herb. Banks in Roxb. Fl. Ind. I. 146; Wight Ic. t. 874. *B. repens*, Linn. Sp. Pl. 3; Hook. f. Fl. Br. Ind. IV. 709; Choisy in DC. l. c. 453; Collett Fl. Siml. 410 t. 131; Prain Beng. Plants 862.——‘Talu-Dama’ Rheede Hort. Mal. VII. 105. t. 56.

PENANG: Curtis! Deschamps! **PROV. WELLESLEY:** Ridley 6983! **SINGAPORE:** Lobb 309!; Ridley 9131! a common weed of roadsides and cultivated fields.—**DISTRIB.** India, Ceylon, Malay Archipelago. tropical and subtropical Asia, Africa and America.

Family XCIV.—AMARANTACEÆ.

Herbs, rarely shrubs, erect or with climbing branches. *Leaves* opposite or alternate, exstipulate. *Flowers* usually hermaphrodite, rarely polygamous or dioecious, small, usually in terminal and axillary simple or paniced spikes, cymes or clusters, the outermost flowers of a cluster sometimes deformed; bracts hyaline or scarious; bracteoles 2, scarious. *Perianth* of usually 5 segments, free or slightly connate below, scarious or hyaline, persistent, imbricate.

nerved. *Stamens* 1—5, opposite the perianth segments; filaments free or connate below in a membranous hypogynous cup, often alternating with membranous staminodes; anthers dorsifixed, 1- or 2-celled. *Ovary* 1-celled, ovoid ellipsoid or globose; ovules 1 or more, amphitropous, erect or suspended from basal funicles; style sometimes simple or obsolete with capitellate stigma, sometimes 2—3-fid with acute stigmas, or styles 2 or 3 papillosely stigmatic on the inner face, erect or recurved. *Fruit* a membranous utricle, rarely a berry or a capsule, breaking irregularly or circumscissily, supported by the persistent perianth. *Seed* erect or inverted, orbicular ovate or reniform, compressed; testa crustaceous; tegmen, if present, membranous; embryo horseshoe-shaped or annular, surrounding a floury albumen.—DISTRIB. Genera 48, species about 500, tropical and subtropical.

Anthers 2-celled:—

Ovary 2— ∞ -ovuled; leaves alternate (Tribe I. CELOSIEÆ):—

- | | |
|------------------------------------|---------------|
| Fruit a berry; shrubby | 1. DEERINGIA. |
| Fruit membranous; herbaceous | 2. CELOSIA. |

Ovary 1-ovuled (Tribe II. AMARANTEÆ):—

Ovule erect; leaves alternate:—

- | | |
|--|---------------|
| Flowers 2-sexual, capitate; utricle circumsciss .. | 3. ALLMANIA. |
| Flowers unisexual, in large clusters; utricle circumsciss or indehiscent | 4. AMARANTUS. |

Ovule suspended from a basal funicle; leaves opposite:—

Flowers clustered, 1—3 perfect, surrounded by deformed ones:—

- | | |
|--|--------------|
| Stamens with interposed staminodes | 5. CYATHULA. |
| Stamens without staminodes | 6. PUPALIA. |

Flowers all perfect:—

- | | |
|--|------------------|
| Staminodes 0; spikes short; perianth-segments soft | 7. PSILOTRICHUM. |
|--|------------------|

Staminodes present:

- | | |
|---|-----------------|
| Spikes rather short; perianth-segments soft, often woolly | 8. ÆRUA. |
| Spikes long; perianth-segments spinescent | 9. ACHYRANTHES. |

Anthers 1-celled; ovary 1-ovuled; ovule suspended from a basal funicle; leaves opposite (Tribe III. Gom-
PHENNEÆ):—

- | | |
|-------|--------------------|
| | 10. ALTERNANTHERA. |
|-------|--------------------|

The following plants seem to be commonly cultivated in gardens, besides some of these described.

Telanthera ficoidea, Moq. in DC. Prodr. xiii. 2. 363 (1849), a native of Brazil and used for edgings and carpet borders, the leaves being of a fine crimson colour.

SINGAPORE: *Deschamps*!

Gomphrena globosa, Linn. Sp. Pl. 224 (1753) the 'Globe Amaranth' probably coming from America, with large globose yellow or crimson heads of flowers. Hook. f. Fl. Br. Ind. IV. 732.

SINGAPORE: *T. Anderson* 80!

1. DEERINGIA, Brown.

Herbs or rambling or climbing shrubs. *Leaves* alternate, petio- late, entire. *Flowers* 1—2-sexual, small, in simple or paniced spikes or racemes, or sometimes fascicled; bract and 2 bracteoles scarious. *Perianth*-lobes 5, oblong, imbricate, spreading in fruit, subequal. *Stamens* 4—5, the filaments broadened and connate at the base in a cup, slender above; anthers reniform-oblong, 2-celled. *Ovary* ovoid or subglobose; stigmas 2—4, subulate; ovules few or many, on long funicles from the base. *Fruit* a globose berry or circumsciss utricule, seated on the spreading persistent perianth. *Seeds* few or many, reniform, compressed; testa crustaceous, puncticulate; em- bryo annular, surrounding the farinaceous albumen; cotyledons linear, plano-convex; radicle descending. **DISTRIB.** Species 5—6, Asiatic, Australian and Pacific, one in Madagascar.

Flowers, in long paniced racemes; stamens exsert;

seeds few, under 6 1. *D. celosioides*.

Flowers, in short spikes; stamens scarcely exsert; seeds

very many 2. *D. indica*.

1. DEERINGIA CELOSIODES, Brown Prodr. Fl. Nov.-Holl. I. 413 (1810). A woody climbing shrub; branchlets long, slender, climb- ing, blackish when dry. *Leaves* membranous, glabrous, ovate or ovate-lanceolate, acuminate at apex, rounded or deltoid-acute, some- times cordate, often unequal at base; upper surface blackish when dry, lower pale; 5—10 cm. long, 4—5 cm. broad but often less; midrib slender, main nerves 7—10 pairs, branching, prominent beneath and joined by irregular transverse nervules; petiole slender, 1—2.5 cm. long. *Flowers* small, in long slender racemes in terminal drooping panicles often 30—40 cm. long; bract and 2 bracteoles ovate acuminate, scari- ous. *Perianth*-lobes oblong, obtuse, 1—1.5 mm. long, scarious on the margins. *Stamens* exsert; anthers oblong-reniform. *Ovary* de- pressed globose; stigmas 3, papillose. *Fruit* a succulent scarlet berry about 5 mm. in diam.; pericarp rather thin; seeds about 3—6, black, puncticulate. Roxb. Fl. Ind. I. 682 and ed. Carey and Wall. II. 511; Wight Ic. t. 728; Wall. Cat. 6888; Dalz. & Gibs. Bomb. Fl.

214; Bot. Mag. t. 2717; Endl. Iconog. t. 62; Miq. Fl. Ind. Bat. I. 1. 1025; Benth. Fl. Austral. V. 209; Baill. Hist. des Pl. IX. 157. t. 230, 231; Hook. f. Fl. Br. Ind. IV. 714; Collett Fl. Siml. 412; Brandis Ind. Trees 518; Prain Beng. Plants 866; *D. baccata*, Moq. in DC. Prodr. XIII. 2. 236; Engl. & Prantl Naturl. Pflanzenfam. III. 1a. 97. t. 49. *D. indica*, Retz in Bl. Bijdr. 542; *Cladostachys frutescens*, Don Prodr. Fl. Nep. 76; Miq. l. c. excl. syn. *Blitum frutescens*, Rumph. Herb. Amb. V. 235 t. 83, fig. 2.

PERAK: at Batu Kuran, *Scortechini* 1593! DISTRIB. India, Burma, Malay Islands, China, Australia.

2. *DEERINGIA INDICA*, Zoll. Syst. Verz. Pl. Jav. 110 (1854). A herbaceous shrub, reaching 1 to 1.5 m. in height; branchlets rather fleshy, angled when dry, glabrous. *Leaves* membranous; lanceolate or elliptic-lanceolate, acuminate at apex, cuneate-acuminate at base; glabrous on both surfaces, pale beneath when dry; 10–20 cm. long, 5–8 cm. broad; midrib rather broad; main nerves 8–11 pairs, the lowest pair rather oblique, the rest nearly at right angles to the midrib, curved near the margin; secondary nerves few; transverse nervules irregular, obscure; petiole slender, 1.5 to 2, sometimes to 4 cm. long. *Flowers* in short axillary glabrous spikes 1–4 cm. long; bract and bracteoles ovate, acute or obtuse, scarious. *Perianth* lobes oblong, acute, concave, scarious on the margins, 2.5–3 mm. long. *Stamens* scarcely exsert; filaments filiform above, gradually broadening to join in a cup 1 mm. long; anthers oblong-reniform. *Ovary* subglobose; stigmas 3, spreading, papillose. *Fruit* a white subglobose berry about 5 mm. in diam.; pericarp thick, fleshy; seeds many (up to 50), angular-reniform, beaked, black, puncticulate. Moq. in DC. Prodr. XIII. 2, 236; Miq. Fl. Ind. Bat. I. 1026.

PERAK: at Kwala Dipang, *Ridley* 9583! *Scortechini*! at Waterloo, *Curtis* 2691! near Goping, Larut, on limestone at 150–300 m. alt. *King's Collector* 4611! DISTRIB. Java, the Moluccas and Philippine Islands.

2. CELOSIA, Linn.

Herbs or rarely shrubs, erect or with climbing branches. *Leaves* alternate. *Flowers* hermaphrodite, in dense terminal and axillary spikes, white or pink, shining; bract and bracteoles scarious. *Perianth*-lobes 5, slightly connate below, scarious, imbricate, oblong or lanceolate, acute or obtuse, longitudinally nerved, erect in fruit. *Stamens* 5; filaments slender, connate below in a membranous hypogynous cup; anthers 2-celled, dorsifixed. *Ovary* 1-celled, ovoid or sub-

globose; ovules 2 or more on long funicles from the base of the ovary; style 0 or short or long, and sometimes elongating after flowering; stigma simple or 2—3, subulate. *Fruit* a utricle dehiscing in circumsciss fashion near the middle, membranous or sometimes coriaceous. *Seeds* 2 or more, erect, lenticular; testa crustaceous, black, shining or dull; embryo annular, surrounding the floury albumen; cotyledons linear; radicle descending or ascending. **DISTRIB.** About 35 species in tropical Asia, Africa and America.

1. *CELOSIA ARGENTEA*, Linn. Sp. Pl. 205 (1753). A glabrous annual herb, reaching 30 cm. to 1 m. in height; stem erect, branches grooved. *Leaves* variable, linear or linear-lanceolate, acuminate at apex and at base, glabrous, entire, 2—10 cm. long, 5—25 mm. broad; nerves irregular; petiole 0 or very short and slender. *Flowers* in dense terminal cylindric spikes, 3 to 25 or more cm. long, at first pink then becoming shining white, sometimes branching at the apex cockscomb-fashion; bract and bracteoles lanceolate, acuminate or awned, scarious, 4—5 mm. long. *Perianth*-lobes linear-lanceolate, sharply acuminate, scarious, about 8 mm. long, 3-nerved. *Stamens* with slender filaments about 3 mm. long, combined below in a cup 2 mm. deep; anthers linear, 1—1.5 mm. long, the bases finally divaricate. *Ovary* ovoid, very thin; style slender, 5 mm. long; stigma small. *Utricle* 3—4 mm. long, ellipsoid, tapering into the persistent style, circumsciss about the middle. *Seeds* 4—8, lenticular, more or less compressed, 1—5 mm. in diam.; testa black, shining. Willd. Sp. Pl. I. 1197; Roxb. Fl. Ind. I. 678 and ed. Carey & Wall. II. 507; Dalz. and Gibs. Bomb. Fl. 215; Wight Ic. t. 1767; Wall. Cat. 6916; Bl. Bijdr. 543; Miq. Fl. Ind. Bat. I. 1. 1028; Moq. in DC. Prodr. XIII. 2. 242; Hook. f. in Fl. Br. Ind. IV. 714; Trimen Fl. Ceyl. III. 393; Cooke Bomb. Fl. II. 486; Prain Beng. Plants 867; Engl. & Prantl Naturl. Pflanzenfam. III. 1.a. 99, t. 51. *C. margaritacea*, Linn. l.c.; Wall. Cat. 6917; Don Prodr. Fl. Nep. 76; Baill. Hist. des Pl. IX. 157 tt. 228, 229. 'Belutta-adeca-manjen' Rheede Hort. Mal. X. 75, 77. tt. 38, 39.

PERAK: river Pluss, Wray 45! PAHANG: at Temerloh, Ridley 2253! MALACCA?: Griffith 4181-2! **DISTRIB.** Throughout India, Ceylon, Tropical Asia, Africa, America: in fields, native country unknown.

3. *ALLMANIA*, Brown.

Erect or diffuse herbs. *Leaves* alternate; linear, obovate or spatulate, entire. *Flowers* hermaphrodite, in terminal and axillary,

sessile or pedunculate, globose or ovoid heads; bract 1, bracteoles 2, scarious. *Perianth*-segments 5, equal, imbricate, free or nearly so, scarious, oblong-lanceolate, nerved, erect in fruit. *Stamens* 5, united below in a membranous hypogynous cup; filaments slender; anthers small, 2-celled, dorsifixed. *Ovary* ovoid, 1-celled, narrowed into a long straight style; stigma capitate, 2-lobed; ovule solitary, erect. *Fruit* a subglobose or ovoid circumsciss membranous utricle. *Seed* 1, orbicular, flattened; testa crustaceous, black, with a basal cup-shaped aril; embryo annular, surrounding copious mealy albumen; cotyledons linear; radicle inferior. **DISTRIB.** About 3 species, in Tropical Asia.

1. *ALLMANIA NODIFLORA*, Br. in Wall. Cat. 6890 (1828). A diffuse annual (or sometimes perennial?) herb; branchlets angular, dichotomously divaricate, pale when dry, glabrous or slightly puberulous. *Leaves* variable, linear-lanceolate to oblong or spatulate, often mucronate at apex; petiole 0 or slender. *Flowers* in globose sessile or shortly pedunculate axillary white or brown heads, 10—15 mm. in diameter; bract linear-lanceolate, 4—5 mm. long, bracteoles similar, rather shorter, keeled. *Perianth*-lobes oblong-lanceolate, acuminate, 5 mm. long, strongly 1-nerved, shortly connate at the base. *Ovary* ovoid, membranous; style 1.5 mm. long; stigma small, capitate, very shortly 2-lobed. *Utricle* membranous, hyaline. *Seed* large, nearly as large as the utricle, orbicular, flattened; aril cup-shaped, 2-lobed. Hook. f. Fl. Br. Ind. IV. 717; Cooke Bomb. Fl. II. 487; Prain Beng. Plants 867; Engl. & Prantl Naturl. Pflanzenfam. III. 1a. 102, t. 55. *Celosia nodiflora*, Linn. Sp. Pl. 298. *Achyranthes nodiflora*, Roxb. Fl. Ind. I. 678. *Chamissoa nodiflora*, Mart.; Moq. in DC. Prodr. XIII. 2. 249; Miq. Fl. Ind. Bat. I. 1. 1029. *C. aspera*, Wight Ic. t. 1772. *C. dichotoma*, Wight Ic. t. 1771.

DISTRIB. India, Ceylon, Malay Peninsula and Archipelago, China.

VAR. *esculenta*, Hook. f. *Leaves* very narrow linear, 3—5 cm. long. *A. esculenta*, Br. in Wall. Cat. 6892; Moq. l.c. 249.

MALACCA: Griffith 4182! **Cuming** 2297! **PAHANG:** Ridley 1409! **SINGAPORE:** Ridley 9493!

VAR. *procumbens*, Hook. f. *Leaves* spatulate or oblanceolate, 3—3.5 cm. long, 10—12 mm. broad. Wall. Cat. 6980 E *in part. A. nodiflora*, Wight Ic. t. 1770.

SINGAPORE: Ridley 3381!

4. AMARANTUS, Linn.

Annual herbs. *Leaves* alternate, petiolate, usually entire. *Flowers* small, monœcious or polygamous, in cymules of three or more, arranged in axillary clusters or dense terminal and axillary spikes or panicles; bract 1, bracteoles 2. *Perianth* of 3 or 5 membranous equal or subequal segments; in ♂ ovate-lanceolate, in ♀ oblong or spatulate. *Stamens* 5 or less, free; anthers 2-celled; staminodes 0. *Ovary* compressed, ovoid, 1-celled; style short or 0; stigmas 2—3, filiform or subulate; ovule 1, erect. *Fruit* an orbicular or ovoid compressed utricle, indehiscent or circumsciss. *Seed* erect, orbicular, compressed; testa crustaceous; embryo annular, enclosing floury albumen; cotyledons linear; radicle inferior. **DISTRIB.** Several species, of which some cultivated: tropical or subtropical.

Perianth-lobes and stamens 5 each; utricle circumsciss:

Leaf axils spinous	1. <i>A. spinosus</i> .
Leaf axils not spinous	2. <i>A. caudatus</i> .

Perianth-lobes and stamens 3 each; no spines:

Utricle circumsciss; perianth-lobes, bracts and bracteoles long-awned	3. <i>A. gangeticus</i> .
Utricle indehiscent; perianth-lobes, bracts and bracteoles shortly-awned	4. <i>A. viridis</i> .

1. **AMARANTUS SPINOSUS**, Linn. Sp. Pl. 991 (1753). An erect glabrous herb. 30–60 cm. high; stems hard, often reddish, with many grooved branches and usually sharp divaricate spines usually in pairs at the leaf axils, 15 mm. long or less. *Leaves* membranous; ovate or oblong, obtuse and sharply mucronate at apex, cuneate at base, glabrous above, sometimes scurfy beneath; 3–8 cm. long, 1–4 cm. broad; main nerves numerous, about 10 pairs, slender, prominent beneath; petiole slender, 1–6 cm. long. *Flowers* very numerous, in cymules of 3 or more in dense axillary clusters and in terminal and axillary dense or interrupted spikes, the upper flower in the spikes usually ♂, the lower ♀ or the ♂ and ♀ mixed; bracts and bracteoles linear-lanceolate, sharply mucronate. *Perianth*-lobes 5: in ♂ ovate-lanceolate, 1-ribbed, scarious, mucronate, 2–3 mm. long; in ♀ shorter, obovate or spatulate. *Stamens* 5; anthers oblong; filaments flattened. *Ovary* ovoid; stigmas 2–3, subulate. *Utricle* circumsciss about the middle, membranous, rugose. *Seed* about 1 mm. in diam.; testa black, shining. Moq. in DC. Prodr. XIII. 2. 260; Willd. Hist. Amarant. 38. t. 4. fig. 8; Roxb. Fl. Ind. III. 611; Dalz. and Gibs. Bomb. Fl. 216; Wight Ic. t. 513; Wall. Cat. 6894; Bl. Bijdr. 540; Miq. Fl. Ind. Bat. I. i. 1031; Hook. f. Fl. Br. Ind.

IV. 718; Trimen Fl. Ceyl. III. 396; Cooke Bomb. Fl. II. 489; Prain Beng. Plants 869.

PENANG: road sides and waste places, *Deschamps*! PROVINCE WELLESLEY: at Krian, *Ridley* 9419! MALACCA: *Griffith* 4183 B! SINGAPORE: *Ridley* 8920! DISTRIB. India, Ceylon, Malay Archipelago, etc.

2. *AMARANTUS CAUDATUS*, Linn. Sp. Pl. 990 (1753). An erect glabrous herb; stems striate. *Leaves* membranous; elliptic, or ovate-lanceolate, obtuse at apex, cuneate at base; both surfaces glabrous, often dotted; 3–7 cm. long, 2–4 cm. broad; main nerves 8–10 pairs, prominent beneath; petiole slender 3–5 cm. long. *Flowers* very numerous, in cymes in dense clusters axillary or along the rachis of terminal or axillary drooping spikes 10–20 cm. long; bracts obovate, sharply long mucronate. *Perianth*-lobes 5, oblanceolate, mucronate, keeled. *Stamens* 5; anthers oblong. *Ovary* ovoid; stigmas 2–3, often thick. *Utricle* circumsciss about the middle, membranous, rugose. *Seed* about 1 mm. in diam.; testa black, shining. Moq. in DC. Prodr. XIII. 2. 255; Wall. Cat. 6907; Willd. Hist. Amarant. 36; Hook. f. Fl. Br. Ind. IV. 719; Prain Beng. Plants 870. *A. cruentus*, Willd.; Roxb. Fl. Ind. III. 610. *A. caudatus* and *A. Alopecurus*, Hochst.

SINGAPORE: *Ridley* 9100!, 10403! 10443! apparently a garden weed; *Deschamps*! DISTRIB. cultivated and run wild in most tropical countries.

This seems to be merely a small weedy form of *A. caudatus* and except for the absence of spines comes very close to *A. spinosus*.

3. *AMARANTUS GANGETICUS*, Linn. Syst. Nat. ed. 10, 1268 (1759). An erect glabrous herb, 60–120 cm. high; stem stout, branching, grooved. *Leaves* membranous, lanceolate, ovate, rhomboid-ovate or deltoid-ovate, obtusely acute and mucronate at apex, rounded and then acuminate at base and decurrent on the petiole; both surfaces glabrous, white-dotted when dry; 5–15 cm. long, 2–10 cm. broad; main nerves about 10 pairs, prominent; petiole slender, 2–8 cm. long, the upper half bordered by the decurrent margins of the blade. *Flowers* very numerous, in cymes clustered in the axils of the leaves and also forming a long terminal more or less interrupted spike, the ♂ and ♀ mixed; bract ovate, scarious, with a long slender awn 4 mm. long; the bracteoles rather shorter, less awned. *Perianth*-lobes 3, lanceolate, long-awned, up to 4 mm. long, those of ♂ shorter and less awned. *Stamens* 3; anthers oblong; filaments slender. *Ovary* ovoid; stigmas 3, subulate. *Utricle* circumsciss about the

middle, membranous, rugose. *Seed* 1—1·5 mm. in diam., flattened; testa shining, black. Willd. Hist. Amarant. t. 6, f. 11; Roxb. Fl. Ind. III. 606; Wall. Cat. 6896 *excl. C.*; Moq. in DC. Prodr. XIII. 2. 261; Miq. Fl. Ind. Bat. I. 1. 1033; Hook. f. Fl. Br. Ind. IV. 719; Trimen Fl. Ceyl. III. 396; Cooke Bomb. Fl. II. 489; Prain Beng. Plants 870. *A. tricolor*, Willd. Sp. Pl. IV. 383; Roxb. l. c. 608; Wall. Cat. 6902. *A. lanceolatus*, Roxb. l. c. 604; Wall. Cat. 6895. *A. tristis*, Willd. l. c. 385; Roxb. l. c. 604; Wall. Cat. 6904, A. C.; Wight Ic. t. 713. Dalz. and Gibs. Bomb. Fl. 215. *A. oleraceus*, Willd. l. c. 386; Roxb. l. c. 605; Wight Ic. t. 715. *A. polygamus*, Willd. l. c. 384; Roxb. l. c. 603; Wall. Cat. 6899 *excl. D.*; Wight Ic. t. 714. *A. lividus*, Willd. l. c. 536; Roxb. l. c. 605; Wall. Cat. 6896 C. *A. melancholicus*, Willd. l. c. 383; Roxb. l. c. 608.

PENANG: about George Town, *Deschamps*! SINGAPORE: Macpherson road, *Ridley* 6256! DISTRIB. Tropical regions, cultivated.

4. *AMARANTUS VIRIDIS*, Linn. Sp. Pl. Ed. 2. 1405 (1763). An erect branching glabrous herb 30—60 cm. high, the branches grooved, often reddish. *Leaves* membranous, ovate or deltoid-ovate, obtuse and usually notched at apex, cuneate or truncate at base; both surfaces more or less white-dotted when dry; 2—8 cm. long, 1—5 cm. broad; main nerves about 6 pairs, slender; petiole slender, 1—6 cm. long. *Flowers* shortly pedicelled, in small cymules in axillary clusters and in terminal and axillary slender more or less interrupted paniculate racemes; bract and bracteoles ovate, acute, green-keeled, shorter than the perianth-lobes. *Perianth*-lobes 3, in ♂ ovate-acuminate, in ♀ obovate, mucronate, membranous, green-keeled, 1—1·5 mm. long. *Stamens* 3; anthers linear-oblong; filaments short, slender. *Ovary* oblong-obovate; style thick; stigmas 2—3, subulate. *Utricle* suborbicular, indehiscent, membranous, rugose, 1·5 mm. in diam., surmounted by the persistent style. *Seed* lenticular, smooth, shining, black, 1 mm. in diam. Roxb. Fl. Ind. III. 605; Hook. f. Fl. Br. Ind. IV. 720; Trimen Fl. Ceyl. III. 397; Cooke Bomb. Fl. II. 490; Prain Beng. Plants 871. *A. polystachyus*, Ham. in Wall. Cat. 6901. *A. fasciatus*, Roxb. l. c. 609; Wight Ic. t. 717. *Euxolus caudatus*, Moq. in DC. Prodr. XIII. 2. 274; Wight Ic. t. 1773; Miq. Fl. Ind. Bat I. i. 1035.

MALACCA: *Griffith*! SINGAPORE: *Kurz*! *Hullett* 241! *Ridley* 4690! *Deschamps*!—DISTRIB. All tropical and warm countries, a weed of cultivation.

5. *CYATHULA*, Lour.

Herbs or undershrubs. *Leaves* opposite, petiolate, entire.

Flowers small, hermaphrodite, in large or small, bracteate and bracteolate, spicate or capitate clusters; perfect flowers 1—3 in each cluster, surrounded by imperfect ones. *Perianth*-segments 5, scarious, 1-nerved, acuminate or with hooked rigid awns; in the imperfect flowers reduced to hooked rigid awns. *Stamens* 5; filaments connate below with intervening lacerate or 2—3-fid staminodes into a hypogynous membranous cup; anthers 2-celled. *Ovary* obovoid, 1-celled; ovule solitary, pendulous from a long basal funicle; style simple, filiform; stigma capitellate. *Fruit* an ovoid membranous utricle enclosed in the perianth, its apex areolate. *Seed* inverse, oblong: testa coriaceous, tegmen membranous; embryo annular; cotyledons linear-oblong, flat, surrounding the farinaceous albumen; radicle erect.—*DISTRIB.* About 10 species in tropical and subtemperate Asia, Africa and America.

1. *CYATHULA PROSTRATA*, Blume Bijdr. 549 (1825). A slender annual herb, prostrate below, erect above, thickened and rooting at the lower nodes; stem angular, glabrous or scaberulous, trichotomously branched above, upper branchlets and rachis densely hispid-tomentose. *Leaves* elliptic-rhomboid or ovate, acute at apex, cuneate at base; both surfaces strigosely hispid, lower often reddish: 2—6 cm. long, 1—3 cm. broad; main nerves 4—6 pair, prominent; petiole very short, sometimes 0. *Flowers* pale violet, in small drooping clusters arranged in terminal spicate pedunculate racemes 10—15 cm. long; pedicels very short; bract and bracteoles ovate, acuminate, hispid-pubescent. *Perianth*-lobes of the 2—3 perfect flowers 5, lanceolate, acuminate, 3-nerved, hispid, 2—2.5 mm. long: those of imperfect flowers similar or reduced to hooked awns. *Stamens* 5 with slender filaments and minute orbicular anthers, alternating with short bifid staminodes and forming below a hyaline cup. *Ovary* obovoid, glabrous; style slender; stigma capitellate. *Utricle* thinly membranous, ovoid, surmounted by the remains of the style. *Seed* 1—1.5 mm. long, oblong-ellipsoid, testa smooth, shining; cotyledons oblong, flat. Moq. in DC. Prodr. XIII. 2. 326; Dalz. and Gibs. Bomb. Fl. 219; Hook. f. Fl. Br. Ind. IV. 723; Trimen Fl. Ceyl. III. 398; Cooke Bomb. Fl. II. 496; Prain Beng. Plants 872. *C. repens*, Moq. l. c. 330. *C. geniculata*, Lour. Fl. Cochinch. I. 112; Miq. Fl. Ind. Bat. I. 1. 1045. *Achyranthes prostrata*, Linn. Sp. Pl. Ed. 2. 296; Roxb. Fl. Ind. I. 674 and Ed. Carey and Wall. II. 501. *Desmochæta prostrata*, DC. Cat. Hort. Monsp. 102; Wight Ic. t. 733. *D. patula*? Wall. Cat. 6937; *D. repens*, Roem. and Sch. Syst. V. 552; Wall. Cat. 6938. 'Scheru-cadelari' Rheede Hort. Mal. X. 157. t. 79.

PENANG: *Curtis* 17! 944! *Deschamps*! MALACCA: *Griffith*! *G. King*! *Harvey*! *Hullett*! PERAK: *Scortechini*!; at Jenah, etc., *Wray* 1754! 3489! 3494! JOHORE: at Kota Tingji, *Ridley* 5726!—DISTRIB. India, Ceylon, Malay Archipelago (Java, *Forbes* 535! Sumatra, *Forbes* 1242!) and through the tropics of the World.

6. PUPALIA, Juss.

Herbs or undershrubs. *Leaves* opposite, petiolate, entire. *Flowers* green, hermaphrodite, fascicled in simple or paniculate spikes, fascicles with 1—2 perfect flowers, the rest imperfect; bract and bracteoles scarious, awned. *Perianth*-segments of perfect flowers 5, nearly equal, lanceolate, acuminate, 3—5-nerved; those of imperfect flowers reduced to awns with spreading hooked bristles. *Stamens* 5; filaments slender, subulate, shortly combined at the base; anthers 2-celled; staminodes 0. *Ovary* ovoid, 1-celled; ovule 1, pendulous from a long basal funicle; style simple; stigma capitate. *Fruit* an ovoid membranous compressed utricle, enclosed in the perianth, the top areolate. *Seed* inverse, lenticular, rostellate; testa thinly crustaceous; tegmen membranous; embryo annular; cotyledons linear-oblong, flat, surrounding the farinaceous albumen; radicle ascending.—DISTRIB: Species 5, Asiatic and African.

1. PUPALIA ATROPURPUREA, Moq. in DC. Prodr. XIII. 2. 331 (1849). A slender, erect, annual or biennial, herb reaching 60 to 150 cm. in height; branches long, straggling or semi-scandent, glabrous, often tinged with purple. *Leaves* membranous, ovate or elliptic-lanceolate, acuminate and mucronate at apex, suddenly contracted at base; both surfaces glabrous or nearly so, white-puncticulate when dry; 2—10 cm. long, 1—5 cm. broad; main nerves distant, about 6 pair; petiole slender, 6—18 mm. long. *Flowers* in sessile clusters in lax-pedunculate terminal spikes, up to 25 cm. long; bracts small, ovate; acuminate, persistent on the rachis; bracteoles 2, larger, ovate, strongly keeled and mucronate, 4 mm. long, deciduous with the flower cluster. *Perianth*-segments 5, ovate-lanceolate, mucronate, 4 mm. long, lanate, 3—5-nerved; those of imperfect flowers reduced to glochidiate purple hooked awns. *Stamens* 5; anthers suborbicular, minute; filaments slender, very thin, joined at base in a shallow hyaline cup. *Ovary* obovate; style slender, persistent in fruit. *Utricle* very thin. *Seed* oblong, 1—2 mm. long, truncate at both ends; testa black, crustaceous; tegmen membranous; cotyledons short; radicle thick and long. Dalz. and Gibs. Bomb. Fl. 219; Miq. Fl.

Ind. Bat. I. 1046; Hook. f. Fl. Br. Ind. IV. 723; Trimen Fl. Ceyl. III. 399; Cooke, Bomb. Fl. II. 497; Prain Beng. Plants 872. *Achyranthes lappacea*, Linn. Sp. Pl. Ed. 2. 95. *excl. Syn. Ed. 1*; Roxb. Fl. Ind. I. 673, and Ed. Carey and Wall. II. 500. *A. atropurpurea*, Lamk. Dict. I. 546. *Desmochæta atropurpurea*, DC. Cat. Hort. Monsp. 102; Wall. Cat 6933 *excl. K*; Wight Ic. t. 731. 'Wellia Codiveli' Rheede Hort. Mal. X. 117 t. 59.

SINGAPORE AND PENANG: Wallich.—DISTRIB. India, Ceylon, Java, Madagascar, etc.

7. PSILOTRICHUM, Blume.

Herbs or undershrubs, 3-chotomously branched. *Leaves* opposite, petiolate, entire. *Flowers* white or greenish, hermaphrodite, in axillary solitary or paniced spikes or clusters; bracts small, chaffy; bracteoles 2, small. *Perianth*-segments 5, slightly connate below, ovate, acuminate, ribbed. *Stamens* 5; filaments unequal, slender, connate below in a thin cup; anthers 2-celled; staminodes 0. *Ovary* oblong or subglobose; style slender; stigma capitellate or 2-fid; ovule 1, pendulous from a long basal funicle. *Fruit* a globose or compressed utricle, enclosed in the hardened perianth. *Seed* inverse, lenticular; testa coriaceous or crustaceous; embryo annular, enclosing the floury albumen; cotyledons thin, flat; radicle ascending.—DISTRIB. Species 10—12, Asiatic, African or Pacific.

1. PSILOTRICHUM TRICHOTOMUM, Blume Bijdr. 545 (1826). A flaccid decumbent subglabrous annual herb 30—40 cm. high; branches erect, striate; nodes hairy. *Leaves* membranous; elliptic, elliptic-lanceolate or lanceolate, rarely obovate, acute at apex, narrowed at base, very pale when dry; 2—6 cm. long, 5—15 mm. broad; main nerves 2—3 pair, oblique, obscure; petiole very short or 0. *Spikes* green, terminal, 5—15 mm. long; flowers reddish, crowded; bract chaffy, persistent on the pubescent rachis; bracteoles minute, deciduous with the flower. *Perianth*-lobes equal, hard, lanceolate, acuminate, glabrous, 3—5-nerved, 2 mm. long, persistent around the fruit. *Stamens* very small; anthers suborbicular; filaments very thin. *Ovary* globose; style short; stigma capitate. *Utricle* membranous. *Seed* small; testa black, shining. Moq. in DC. Prodr. XIII. 1. 280; Hook. f. Fl. Br. Ind. IV. 725. *Achyranthes? carnos*a, Wall. Cat. 6931. *Leiospermum ferrugineum*, Wight Ic. t. 721. *Ptilotus trichotomus*, Miq. Fl. Ind. Bat. I. 1. 1037.

PERAK: in open ground on mountains at 250—300 m., King's

Collector 10732!—*DISTRIB.* India, Burma, Java, Sumatra (Lampor, 180 m. *Forbes* 2650 !), Borneo, Philippines.

AERUA, Forsk.

Herbs or undershrubs, more or less woolly. *Leaves* alternate or opposite. *Flowers* hermaphrodite or polygamous, in simple or paniced spikes; bract and 2 bracteoles small. *Perianth* 5-(rarely 4-) lobed, lobes equal or the outer broader, usually more or less woolly. *Stamens* 5, connate with short or long intervening staminodes in a short hypogynous cup; anthers 2-celled. *Ovary* ovoid or subglobose, 1-celled; ovule solitary, pendulous from a long basal funicle; style simple, short or long; stigma capitellate. *Fruit* a membranous utricle or circumsciss capsule with coriaceous crown. *Seed* inverse; testa coriaceous; *Embryo* annular, surrounding floury albumen; cotyledons linear; radicle inferior.—*DISTRIB.* Tropical Africa and Asia, species about 15.

1. *AERUA CURTISII*, Oliv. in Hook. Ic. Plant. t. 2201 (1892). A straggling undershrub or herb apparently perennial; branchlets pale, crispate-pubescent, grooved when dry. *Leaves* opposite, membranous; lanceolate, acuminate at apex, acuminate and long decurrent on the petiole at the base; upper surface puberulous at length glabrous, lower softly pubescent with whitish hairs, at length nearly glabrous; 6—12 cm. long, 2—5 cm. broad; midrib slender; main nerves 6 pairs, oblique; transverse nervules and reticulations obscure; petiole slender, 1—2 cm. long. *Flowers* in spikes, 2—4 cm. long in axillary subumbellate panicles or fascicles on a slender peduncle 1—3 cm. long; bract and 2 bracteoles ovate acuminate, 1 mm. long, the former persistent after the fall of the fruit with the bracteoles and perianth; rachis softly strigosely pubescent. *Perianth*-lobes ovate-oblong, acute, white, scarious, 5—7-nerved, 2—3 mm. long. *Stamens* small, the cup and staminodes hyaline, the filaments deltoid-subulate; anthers suborbicular. *Ovary* membranous, subglobose; style short; stigma capitate; ovule pendulous on a long funicle. *Utricle* membranous. *Seed* deeply and obliquely reniform, 2 mm. in diam.; testa black, minutely punctulate.

PERAK: bottom of Waterloo Estate, *Curtis* 2712! *Scortechini*! on rocks in Upper Perak, at 90 m. alt., *Wray* 3698!

This species has not much the appearance of a species of *Aerua*; it more nearly resembles a *Psilotrichum* as I at first believed it to be. The presence, however, of antherless filaments between the stamens requires it to be described in *Aerua*.

8. *ACHYRANTHES*, Linn.

Herbs, sometimes woody below. *Leaves* opposite, petiolate, entire. *Flowers* hermaphrodite, in slender simple and paniced spikes, soon deflexed; bracts membranous, spinescent, persistent on the rachis; bracteoles 2, spinescent. *Perianth* segments 5, lanceolate, aristate, rigid, somewhat connate below, ultimately ribbed and hardened. *Stamens* 2—5; filaments filiform, connate at the membranous base and alternating with as many square staminodes which are toothed lacerate or with a toothed scale at the back; anthers 2-celled. *Ovary* oblong, subcompressed, 1-celled; ovule solitary, pendulous from a long basal funicle; style filiform; stigma capitellate. *Fruit* an oblong or ovoid utricle, apex rounded or areolate. *Seed* inverse, oblong; testa coriaceous, tegmen membranous; embryo annular, surrounding the floury albumen; cotyledons oblong-lanceolate, incurved again; radicle erect.—**DISTRIB.** About 15 species, tropical and subtropical.

1. *ACHYRANTHES ASPERA*, Linn. Sp. Pl. 204 (1753). An erect undershrub reaching 30—90 cm. in height; stem stout and woody at base, the nodes swollen; branches few, terete or obscurely quadrangular, pubescent, striate. *Leaves* extremely variable, thick, elliptic or obovate sometimes nearly orbicular, rounded or subacute at apex, narrowed at base; both surfaces softly pubescent; 3.5—6 cm. long, 2.5—4 cm. broad; main nerves 3—4 pair, obscure; petiole 6—8 mm. long. *Flowers* greenish-white, numerous, stiffly deflexed against the woolly rachis, in elongate terminal lengthening spikes, often 50 cm. long in fruit; bracts ovate, aristate, membranous, persistent, 3—4 mm. long; bracteoles broadly ovate with a hard spine as long as or slightly longer than the blade, deciduous with the perianth, 3—5 mm. long. *Perianth*-lobes lanceolate, aristate, subequal, with narrow membranous margins, 3—6 mm. long. *Stamens* 5; filaments filiform; staminodes fimbriate; anthers oblong, scarcely 1 mm. long. *Utricle* oblong-cylindric, membranous, enclosed in the hardened perianth, 2—3 mm. long. *Seed* brown; cotyledons long, inflexed. Moq. in DC. Prodr. XIII. 2. 314; Roxb. Fl. Ind. I. 672 and Ed. Carey and Wall. II. 496; Dalz. and Gibs. Bomb. Fl. 218; Wight Ic. t. 1777; Trimen Fl. Ceyl. III. 404; Wall. Cat. 6924 excl. H; Miq. Fl. Ind. Bat. I. 1. 1042; Hook. f. Fl. Br. Ind. IV. 731; Cooke Bomb. Fl. II. 495; Prain Beng. Plants 875; Baill. Hist. des Pl. IX. 153. tt. 221—223. 'Cadelari' Rheede Hort. Mal. 155, t. 78.

SINGAPORE: *Ridley* 10632!—**DISTRIB.** India, Ceylon and all tropical regions.

9. ALTERNANTHERA, Forsk.

Herbs, usually prostrate, at any rate at base. *Leaves* opposite. *Flowers* hermaphrodite, small, white, in axillary often clustered heads; bract and 2 bracteoles scarious. *Perianth* segments 5, unequal, the 2 lateral innermost, concave. *Stamens* 2—5; filaments short, connate in a short cup, with or without intervening staminodes; anthers 1-celled. *Ovary* orbicular or ovoid; style short; stigma capitate; ovule solitary, pendulous from a long basal funicle. *Fruit* a compressed ovoid orbicular or obcordate utricle, the margins usually thickened or winged. *Seed* inverse, lenticular; testa coriaceous or crustaceous; embryo annular, surrounding the floury albumen; cotyledons narrow; radicle superior.—DISTRIB. Species about 16, tropical and subtropical.

1. ALTERNANTHERA SESSILIS, Br. Prodr. Flor. Nov.-Holl. 417 (1810). A prostrate herb, or the lower part of the stem prostrate and rooting, the upper erect; branches many, glabrous below, the uppermost with 2 opposite lines of soft hairs. *Leaves* somewhat fleshy linear-oblong, lanceolate, oblanceolate or elliptic, obtuse or subacute at apex, narrowed at base; both surfaces glabrous; margins entire or obscurely denticulate; 1—5 cm. long, 1—2 cm. broad; main nerves 5—7 pairs, obscure; petiole very short or 0. *Flowers* sessile, white, shining, in small axillary sessile heads; bract and bracteoles ovate, acuminate, scarious, 1—1.5 mm. long. *Perianth*-segments 5, nearly equal, ovate, acuminate, scarious, 1-nerved, 2—3 mm. long. *Stamens* 2—3, very short; staminodes usually 0. *Ovary* obcordate, compressed, broader than long; style very short. *Utricle* obcordate, compressed, about 2 mm. long by 3 mm. broad, margins prominently thickened. *Seed* 1—1.5 mm. in diam., suborbicular; testa coriaceous, dark brown. Moq. in DC. Prodr. XIII. 2. 357; Dalz. and Gibs. Bomb. Fl. 220; Wight Ic. t. 727; Wall. Cat. 6921; Miq. Fl. Ind. Bat. I. 1. 1048; Hook. f. Fl. Br. Ind. IV. 731; Prain Beng. Plants 875. *A. triandra*, Lam. Encyc. Method. I. 95; Trimen Fl. Ceyl. III. 405; Cooke Bomb. Fl. II. 499. *A. denticulata*, Wall. Cat. 6922. *A. prostrata*, Don Prodr. Fl. Nep. 86; Moq. l. c. 360 for the most part. *Gomphrena sessilis*, Linn. Sp. Pl. 225. *Achyranthes triandra*, Roxb. Fl. Ind. I. 678 and Ed. Carey and Wall. II. 505. "Coluppa" Rheede Hort. Mal. X. 21. t. 11.

PENANG: *Curtis* 1043!; *Deschamps*! PERAK: *Scortechini*! SELANGOR: *Goodenough*! PAHANG: *Ridley* 1214! SINGAPORE: *Kunstler* 143! *Deschamps*!—DISTRIB. All warm countries.

Family XCV.—POLYGONACEÆ.

By A. T. Gage.

Herbs or shrubs. *Leaves* usually alternate and entire, sometimes serrulate. *Stipules* usually membranous and forming a tube encircling the stem. *Inflorescence* axillary, racemose, spicate, capitate or paniculate. *Flowers* usually bi-sexual, pedicellate; perianth-segments 3—6, usually 5, free or more or less connate, imbricate in the bud, persistent. *Stamens* usually 5—8, perigynous. *Disc* annular, glandular or absent. *Ovary* free, biconvex or 3—4-angled. *Styles* 1—3; stigmas various, usually capitellate. *Ovule* 1, orthotropous; nutlet hard, usually included in the perianth. *Seed* erect, with membranous testa and horny or floury albumen. *Embryo* usually lateral, radicle superior.—DISTRIB. Species over 600, distributed all over the world, but with a preponderance of species in temperate regions.

1. POLYGONUM, Linn.

Herbs or shrubs. *Leaves* alternate, entire, usually petioled, stipules forming a membranous tube (ocrea) surrounding the stem. *Inflorescence*—in the Malayan Peninsular species—a branched spiciform raceme or a capitulate panicle. *Flowers* small, pink or white, pedicellate in the axils of small membranous spathe-like bracts. *Perianth-segments* usually 5. *Stamens* 5—8, perigynous, usually with minute yellow glands between the bases of the filaments; anthers usually pink or purple. *Ovary* lenticular or trigonous. *Styles* 2—3; stigmas capitellate. *Nut* included in the perianth, biconvex or trigonous, brown or black, usually polished.

Inflorescence of branched spiciform racemes:—

Ovary and nutlet bi-convex:—

Stem stout, over 6 dm.; leaves large, 23 cm. long, 4·5 cm. broad, very tomentose 1. *P. tomentosum*.

Stem slender, less than 3 dm.; leaves small, 6·5 cm. long, 6 mm. broad, glabrous or minutely strigose .. 2. *P. minus*.

Ovary and nutlet trigonous:—

Perianth eglandular 3. *P. barbatum*.

Perianth glandular:—

Raceme very long, slender, decurved and long-interrupted 4. *P. flaccidum*.

Raceme rather short, scarcely decurved and short-interrupted 5. *P. Hydropiper*.

Inflorescence of capitulate panicles:—

An unarmed shrub 6. *P. chinense*.

Plants usually with recurved prickles on stem and leaves, sometimes only one or two at the base of the stipules:—

Nutlet trigonous	..	..	..	7. <i>P. strigosum</i> .
Nutlet biconvex	..	..	..	8. <i>P. pedunculare</i> .

It is curious that *P. plebejum*, although so widely spread throughout the tropics, appears to be as conspicuously absent from the Malayan Peninsula as from Ceylon.

1. *POLYGONUM TOMENTOSUM*, Willd. in Sp. Pl. II. 447 (1799). Root-stock prostrate, annual. Stems 6—12 dm., stout, erect, unbranched, with well developed internodes, grooved and glabrous or slightly pubescent where exposed. Leaves light green when fresh, very shortly petioled lanceolate, finely acuminate both at apex and base, strigosely or silkily hairy on both surfaces, 14—28 cm. long and 2·5—4·5 cm. broad; petiole 6 mm. long; veins numerous, 20—30, often obscure. Stipular-tube well developed, membranous, almost or entirely concealing the internode and impressed by its grooves and furrows, sparsely or thickly strigosely hairy; mouth truncate, beset with stiff cilia. Inflorescence of branched spiciform racemes; peduncles stout, strigose; racemes 5—10 cm., erect; bracts crowded, tubular, strigose and ciliate. Flowers 4—6 in the axil of each bract; pedicels about 3 mm. long, articulated below the perianth, and surrounded at the base by a delicate hyaline membranous bracteole. Perianth eglandular, about 4 mm. in diameter, white; segments 5, subequal, strongly veined. Stamens 5—8, alternating with minute glands at the base of the filaments which are nearly as long as the perianth segments; anthers large. Ovary lenticular. Style short, bifid above; stigmas capitellate. Nut large, biconvex or orbicular, black polished, closely invested by the perianth. Roxb. Hort. Beng. 29 and Fl. Ind. II. 287; Miq. Fl. Ind. Bat. I. i. 1006; Hook. f. Fl. Br. Ind. V. 30; Wall. Cat. 1709 C and D. *Polygonum ocreatum*, Houtt. Pf. Syst. VI. 442, t. 49, f. 1. *Polygonum pulchrum*, Blume Bijdr. 530.

PERAK: *Kunstler* 393!; *Wray* 2034!; at Ipoh, *Curtis* 3178!; *Deschamps*!.—DISTRIB. Africa, India, Burma, Andamans, Siam, Malayan Archipelago, Philippines.

2. *POLYGONUM MINUS*, Huds.; Meissn. in DC. Prodr. XIV. 1. 111 (1856). Stem creeping or ascending or erect, 15—30 cm. faintly grooved, glabrous. Leaves sessile, linear or lanceolate, acute, glabrous or minutely strigose, especially on the midrib and nerves beneath, 2—5·7 cm. long and about 6 mm. broad; nerves few or none apparen

Stipular-tube much shorter than the internodes, sparsely adpressedly strigose, truncate; mouth beset with stiff cilia considerably shorter than the tube. *Inflorescence* of branched spiciform racemes; peduncles slender, glabrous; racemes 1·3—2·5 cm., erect; bracts tubular, glabrous, stoutly ciliate. *Flowers* minute, 5 or more in the axil of each bract, on pedicels as long as or longer than the perianth segments. *Perianth* eglandular, segments 5, subequal. *Stamens* 5—8, very small. *Style* bifid above; stigmas capitellate. *Nut* minute, lenticular, black polished, included in the perianth. Boiss. Fl. Orient. IV. 1029; Miq. Fl. Ind. Bat. I. i. 1002; Hook. f. Fl. Br. Ind. V. 36; *Polygonum Posumbu*, Wall. Cat. 1722. *Polygonum tenellum*, Bl. Bijdr. 530. *Polygonum hypostictum* Miq. in Herb. Hohen. 971. *Polygonum strictum*, Allioni, Wight Ic. t. 1800.

PERAK: *Kunstler* 810!. PAHANG: *Ridley* 1616!.—DISTRIB. Europe, Temperate and Tropical Asia, Australia. Introduced into America.

3. *POLYGONUM BARBATUM*, Linn.; Meissn. in DC. Prodr. XIV. 1. 104 (1856). Branches stout, erect, glabrous, slightly grooved, 3—12 dm. *Leaves* very shortly petioled, lanceolate or linear-lanceolate, acuminate at both apex and base, glabrous or sparsely strigose or strigose only on the margins or midrib beneath, 9·5—15 cm. long, 1·3—2·5 cm. broad. *Stipular-tube* much shorter than the internodes, membranous, glabrous or with adpressed strigose hairs; mouth truncate, with stiff cilia longer or shorter than the tube. *Inflorescence* of branched spiciform racemes; peduncles slender, glabrous or more or less strigose. *Racemes* about 5·7 cm. long; bracts crowded, tubular, glabrous, stiffly ciliate. *Flowers* 4 or more in the axil of each bract; pedicels as long as or longer than the perianth segments. *Perianth* white, eglandular, very small; segments 5, subequal. *Stamens* 5—8, unequal, alternating with minute basal glands. *Ovary* trigonous. *Style* trifid above, stigmas capitellate. *Nutlet* trigonous, blackish brown, polished, included in the perianth. Bab. in Trans. Linn. Soc. XVIII. 100; Wall. Cat. 1708; Wight Ic. t. 1798; Miq. Fl. Ind. Bat. I. i. 999. Hook. f. Fl. Br. Ind. V. 37. *Polygonum hispidum*, Ham. *Polygonum rivulare*, Koen.; Roxb. Fl. Ind. III. 290; Grah. Cat. Bomb. Pl. 172. *Polygonum Hornemanni*, Meissn. in DC. l. c. 107.

JOHOR: *Ridley* 11024!. MALACCA: *Griffith*!. PENANG: *Curtis* 2785!. PERAK: at Ipoh, *Curtis* 3179!. SELANGOR: *Goodenough* 10461!. SINGAPORE: *Hullett* 10!; *Goodenough* 1604!; *Ridley* 3756!, 10729!.—DISTRIB. Tropical Asia and Africa, and Australia.

4. *POLYGONUM FLACCIDUM*, Meissn. in DC. Prodr. XIV. 1. 107 (1856). Stem erect or ascending, 6—9 dm., simple or branched, glabrous or more or less strigose, grooved and often glandular. *Leaves* shortly petioled, lanceolate or elliptic-lanceolate, acuminate, many nerved, glabrous or hispid or strigose on the midrib, margin, and nerves on both surfaces, glandular, 6.3—15 cm. long and 1.5—3.8 cm. broad. *Stipular-tube* much shorter than the internode, adpressedly strigose, often glandular; mouth truncate, beset with long stout cilia. *Inflorescence* of long filiform branched decurved spiciform racemes; peduncles glabrous, often glandular; racemes 5—16 cm. long; bracts distant, tubular, glabrous, often glandular, shortly ciliate. *Flowers* 3 or more in the axil of each bract, on pedicels as long as or longer than the perianth segments. *Perianth* segments 5, pink, subequal, thickly glandular. *Stamens* 7—8, subequal. *Ovary* trigonous. *Style* trifid almost to the base; stigmas capitellate. *Nutlet* small, trigonous, black, granulate. Boiss. Fl. Orient. IV. 1029; Hook. f. Fl. Brit. Ind. V. 39. *Polygonum tenellum*, Roxb. Fl. Ind. II. 289. *Polygonum mite*?, Wall. Cat. 1721, 1721-1. *Polygonum Rottleri*, Roth Nov. Pl. Sp. 205.

PERAK: *King's Collector* 809!, 2503!; *Ridley* 2964!. PAHANG: *Ridley* 1335!.—DISTRIB. India and Malayan Archipelago.

5. *POLYGONUM HYDROPIPER*, Linn Sp. Pl. 361 (1753). An annual herb with stout erect or ascending stem; branches obscurely grooved, glabrous and often glandular. *Leaves* subsessile or very shortly petioled, lanceolate or oblong lanceolate, glabrous or with midrib nerves and margin more or less scabrid, often glandular, 5—9 cm. long and 1—2 cm. broad. *Stipular-tube* much shorter than the internode, membranous, glabrous or sparingly strigose, mouth truncate, shortly ciliate. *Inflorescence* of terminal and axillary, simple or branched, slender flexuous spiciform racemes; bracts more or less irregularly distant, tubular, glabrous, glandular or eglandular, shortly ciliate or eciliate. *Flowers* 2 or more in the axil of each bract, on pedicels as long as the perianth segments. *Perianth* pink, segments 5, thickly glandular, 2 outer narrower than the three inner. *Stamens* 5—8; anthers minute. *Ovary* trigonous; style trifid above; stigmas capitellate. *Nutlet* trigonous, black, granulate. Meissn. in DC. Prodr. XIV. 1. 109; Boiss. Fl. Orient. IV. 1029; Fl. Dan. t. 1576. *Polygonum Donii*, Wight Ic. t. 1801.

NEGRI SEMBILAN: *Ridley* 10024! PAHANG: *Ridley* 2254!.—DISTRIB. Cosmopolitan.

6. *POLYGONUM CHINENSE*, Linn. Sp. Pl. 363 (1753). A small shrub reaching a height of 1·5 m.; stem and branches glabrous or slightly pubescent, sometimes glandular, grooved. *Leaves* with a short petiole 6—12 mm. often auriculate and slightly winged above; lamina oblong-ovate or deltoid-ovate, acute, base truncate, rounded or acute, of upper leaves often cordate or amplexicaul, glandular or not, usually glabrous, sometimes sparsely hispidly-hairy especially on the midribs and nerves beneath; margins crenulate or entire; nerves from 5 or 6 to 20 or more, prominent beneath. Length of lamina 2·5—16 cm., breadth 2—8 cm. *Inflorescence* of axillary and terminal corymbose or paniculately branched leafily-bracteate cymes bearing the flowers in few or many capitulate clusters; peduncles glandular or hispidulous, especially near the flower heads; capitula 6—8 mm. in diameter; bracts of the flower-clusters glabrous or hispidly-hairy, eciliate. *Perianth* segments 5, white or pink, subequal, eglandular. *Stamens* 7—8, in two whorls alternating with small basal glands. *Ovary* trigonous; style trifid above; stigmas capitate. *Nutlet* trigonous, granulate, variable in size. Meissn. in DC. Prodr. XIV. 1. 130; Monog. 60; in Wall. Pl. As. Rar. III. 60; Bab. in Trans. Linn. Soc. XVIII. 109; Roxb. Fl. Ind. II, 289; Wight Ic. t. 1806; Grah. Cat. Bomb. Pl. 172; Dalz. and Gibs. Bomb. Fl. 214; Hook. f. Fl. Brit. Ind. V. 44. *Polygonum cymosum*, Roxb. l. c. *Polygonum auriculatum*, Meissn. Monog. 39, t. 6; Wall. Cat. 1705 A. and L. *Polygonum polycephalum*, Wall. Cat. 1707. *Polygonum brachiatum*, Poir. Dict. IV. 15; Wall. Cat. 1706. *Polygonum patens*, Don Prodr. 73; Meissn. Monog. 60. *Polygonum corymbosum*, Willd. Sp. Pl. II. 452. *Polygonum ovatum*, Heyne in Roth. Nov. Sp. 206. *Polygonum adenotrichum*, Wall. Cat. 1705 E. *Ampelgynum chinense*, Lindl. in Bot. Regist. 1838. *Coccoloba crispata*, Ham. in Roxb. Fl. Ind. II. 292. *Coccoloba indica*, Wall. Cat. 1705 H.

PERAK: *Scortechini*!; *Kunstler* 7968!.—DISTRIB. India, Ceylon, Burma, Malayan Archipelago, Philippines, China and Japan.

7. *POLYGONUM STRIGOSUM*, R. Br. Prodr. Fl. Nov. Holl. 420, (1810). *Stem* stout, 6—12 dm., erect or ascending, grooved and more or less covered with recurved prickles. *Leaves* shortly petioled, linear-oblong, acute, base truncate or shallow-cordate, glabrous or pubescent beneath, nerves numerous; petiole 6—12 mm. long; lamina 2·5—7·5 cm. long and 6—18 mm. broad. Petiole, margin and midrib beneath beset with retrorse prickles. *Stipular-tube* much shorter than the internode and encircled with a ring of recurved prickles

at the base, membranous, glabrous or adpressedly strigose, mouth shortly ciliate. *Inflorescence* of corymbose or paniculate cymes bearing about 3—6 obpyramidal or shortly oblong capitula; peduncles thickly glandular-hairy; bracts glandular-hairy and ciliate. *Flowers* rather large, on pedicels as long as the perianth segments. *Perianth* tubular; lobes 5, shallow. *Stamens* 5, minute. *Ovary* flat; style bifid above; stigmas capitellate. *Nutlet* bi-convex. Meissn. in DC. Prodr. XIV. i. 134; Hook. f. Fl. Br. Ind. V. 47. *Polygonum horridum*, Roxb. Fl. Ind. II, 291; Meissn. in Wall. Pl. As. Rar. III. 58, and in DC. Prodr. XIV. i. 133; Wall. Cat. 1697 B and D. *Polygonum muricatum*, Wall. Cat. 1697. *Polygonum sagittatum*, Don Prodr. 73.

PENANG: Wallich 1697 D in Herb. Calcutt.!.—DISTRIB. India, Burma, Ceylon, Malayan Archipelago, China.

8. POLYGONUM PEDUNCULARE, Wall. Cat. 1718 (1828). *Stem* somewhat slender, erect, 3—6 dm., grooved, glabrous or with a few scattered retrorse prickles. *Leaves* shortly petioled, lanceolate or oblong acute, base acute, often unequal or truncate or shallow-cordate, many nerved, glabrous or minutely scaberulous on the margin and midrib beneath; petiole 6—12 mm. long; lamina 2·5—6·3 cm. long and 6—25 mm. broad. *Stipular-tube* considerably shorter than the internode, glabrous or minutely prickly or with a few retrorse prickles surrounding the base, mouth eciliate. *Inflorescence* of paniculately divaricate slender branches, bearing a few globose or shortly oblong heads; peduncles slender, glabrous or sparsely hispid; bracts glabrous, eciliate or very shortly and sparingly ciliate. *Flowers* very shortly pedicelled; perianth segments 5, subequal. *Stamens* 5. *Ovary* lenticular; style bifid above; stigmas capitellate. *Nutlet* biconvex or globose, polished. Meissn. in DC. Prodr. XIV. 1. 133 in part; Miq. Fl. Ind. Bat. I., i. 1011. Hook. f. Fl. Br. Ind. V. 48. *Polygonum glabratum*, Wall. Cat. 6285.

JOHORE: Ridley 4220! and 11027!. MALACCA: Griffith!; Stoliczka!. PAHANG: Ridley 1616!. PENANG: Deschamps!. PERAK: Wray, 1890!, 2030!; Kunstler 2498!; Ridley 2965!. SELANGOR (?): Ridley 8175!. SINGAPORE: Wallich 1718!.—DISTRIB. India, Ceylon, Malayan Archipelago, Australia, Philippines, China.

Family XCVII.—ARISTOLOCHIACEÆ.

Herbs or shrubs, often climbing, usually with more or less unpleasant odour. *Leaves* alternate, petiolate, entire or lobed; stipules 0.

Flowers hermaphrodite, often large, usually lurid; terminal, axillary or lateral; solitary, racemose or cymose; bracts various, often wanting. *Perianth* simple, more or less adnate to the top of the ovary, regular or irregular, 3-lobed or tubular and variously shaped, the lobes valvate. *Stamens* 6 or more, adnate in 1 or 2 series to the style-column; cells parallel, extrorse, opening longitudinally. *Ovary* 4—6-celled; placentas parietal, free or meeting in the axis; ovules numerous, anatropous; style columnar ending in stigmatic lobes. *Fruit* capsular or baccate. *Seeds* numerous, horizontal or pendulous; albumen fleshy, copious, embryo minute.—DISTRIB. Species about 200, chiefly tropical.

Perianth regular; ovary 4-celled; capsule elongate

Stamens uniseriate..	..	..	..	1. APAMA.
Stamens biseriate ..	..	..	..	2. THOTTEA.

Perianth irregular, usually tubular with an inflated base and

expanded limb; capsule not elongate	3. ARISTOLOCHIA.
-------------------------------------	----	----	------------------

1. APAMA, Lamk.

Shrubs or undershrubs, with stellate hairs or glabrate. *Leaves* alternate, petiolate, 3—5-ribbed, nerves and reticulations prominent beneath; stipules 0. *Flowers* in axillary or terminal or sub-radical bracteate cymes. *Perianth* shortly campanulate, equally 3-lobed, valvate. *Stamens* 6 to 12, uniseriate, free or connate around the style; anthers extrorse; cells 2; connective thick. *Ovary* inferior, elongate, 4-celled; style short; stigmas 3 or more, free or spreading in a flattened disk; ovules numerous, uniseriate in vertical rows from the axis, pendulous. *Capsule* elongate, 4-gonous, the keeled valves dehiscing septicidally from the central placenta of cruciform section. *Seeds* very many, oblong, trigonous, sometimes winged, attached in the furrows of the placenta in a vertical row; testa rugose, with a crustaceous outer and a membranous inner integument; albumen fleshy; embryo minute.—DISTRIB. Species 4 or 5, India and Malaya, one species in China.

Style column expanded in a disk; perianth-tube spreading;
stamens more than 6, short, connate; leaf-ribs reaching
nearly to the apex of the ovate long acuminate leaf (Sect.

1. BRAGANTIA)1. *A. corymbosa*.

Style column divided in 3 erect stigmas; perianth-tube
urceolate-campanulate; stamens 6, long, free; leaf-ribs
reaching scarcely to the middle of the ovate-orbicular,
acute leaf (Sect. 2. CYCLODISCUS)2. *A. tomentosa*.

1. *APAMA CORYMBOSA*, Soler. in Engl. & Prantl Naturl. Pflanzenfam. III. i. 272 (1889). A spreading shrub reaching 2.5 to 3 m. in height; branchlets brown, terete, jointed at the nodes. *Leaves* distichous, chartaceo-coriaceous; ovate ovate-oblong or ovate-lanceolate, long cuspidate-acuminate at apex, rounded or cuneate at base, entire; upper surface smooth, shining, glabrous except on the ribs and nerves, lower glaucescent and finely stellate-puberulous; 8—16 cm. long, 4—7 cm. broad; ribs 5 from the base, the outer pair close to the margin, the inner pair extending nearly to the apex; main nerves from the midrib 1 to 3 pairs, all joined by very prominent transverse nervules and reticulations; petiole short, about 5 mm. long, twisted. *Cymes* corymbose, terminal and axillary in upper leaf-axils, 5—8 cm. long and about as broad, minutely grey-puberulous; bracts linear, subulate, up to 5 mm. long; branches spicate; buds depressed. *Perianth-tube* spreading; lobes cordate, acute, 2—3 mm. in diam., greenish-grey, thick, rough within. *Stamens* 8 to 10 or more; anther cells parallel, short, rather distant. *Stigmas* spreading in a disk. *Capsule* 25—35 cm. long, 5 mm. broad, smooth, acuminate, torulose; pericarp 4-keeled, keels puberulous. *Seeds* trigonous, oblong-lanceolate, winged on the margins and at the ends, 4—6 mm. long, prominently rugose. *Bragantia corymbosa*, Griff. in Trans. Linn. Soc. XIX. 335; Duchart. in DC. Prodr. XV. i. 429; Miq. Fl. Ind. Bat. I. i. 1068; Hook. f. Fl. Br. Ind. V. 73. *B. melastomæfolia*, Duchart. l.c. *Asiphonia piperiformis*, Griff. l.c. 333, t. 37, Notul. 344 and Ic. Pl. Asiat. t. 528; Ann. Sc. Nat. Sér. 3, VII. 338. *Strakæa melastomæfolia*, Presl Epim. Bot. 221.

PENANG and PROVINCE WELLESLEY: Maxwell's hill and Kubang Ulu Reserve, *Curtis* 2045!. PERAK: at Thaipeng and Ralan Tujor, *Wray* 650!, 1793!; Larút Peak and Goping, *King's Collector* 437!, 2875!. SELANGOR: Caves at Kwala Lumpur, *Ridley* 411!. PAHANG: Raub track, *Machado* 11552!. MALACCA: *Griffith* K. D. 4438!; *Maingay* K. D. 1320!; *Lobb*!; *Cuming* 2333!; Bukit Panchore, *Derry* 165!.—DISTRIB. Sumatra (*H. O. Forbes* 2965).

2. *APAMA TOMENTOSA*, Soler. in Engl. & Prantl Naturl. Pflanzenfam. III. i. 272 (1889). A small undershrub, creeping below and rooting, then ascending, reaching 25 to 35 cm. in height; branchlets grey, hispid, furrowed, angular, geniculate and jointed at the nodes. *Leaves* 2 to 3 at the ends of the branchlets, chartaceo-coriaceous; ovate or orbicular-ovate, acute at apex, rounded or cordate at base, entire; upper surface smooth, shining, glabrous, lower white-hispid or villous; 12 to 20 cm. long, 8 to 12 cm. broad; ribs 3 to 7 from the base, the

outer 1—2 pairs close to the margin and faint, the inner pair stout, reaching to about the middle of the leaf; main nerves from the midrib 6—7 pairs, arching upwards, joined prominent by irregular transverse nervules and reticulation; petiole 5 to 10 mm. long, densely hispid. *Cymes* racemose from near the base of the stem, 5 to 10 cm. long, densely grey-hispid; bracts many, persistent, linear or linear-oblong, up to 1 cm. long; buds obovate, depressed at top. *Perianth* dull claret-coloured, yellow at centre; tube urceolate-campanulate below for 5 mm., annulate within, then spreading and divided to below the middle in 3 ovate cordate lobes 5 to 10 mm. in diam., lobes rough within. *Stamens* 6, free above, filaments joined below; anthers 2-celled, linear, surmounted by the acute produced connective. *Style*-arms 3, erect, ending in rounded hispid stigmas produced beyond the stamens. *Capsule* 7 to 9 cm. long, 4 mm. broad, linear, long acuminate, smooth, torulose; pericarp 4-keeled, the bosses of the seeds prominent when dry. *Seeds* trigonous, oblong, not winged, 4 mm. long, prominently rugose. *Bragantia tomentosa*, Blume Enum. Pl. Jav. 82; Duchart. in DC. Prodr. XV. i. 431; Benn. in Horsf. Pl. Jav. Rar. 43, t. 11; Griff. in Trans. Linn. Soc. XIX. 335; Miq. Fl. Ind. Bat. I. i. 1068; Hook. f. Fl. Br. Ind. V. 73. *B. khasiana*, Griff. l.c. *B. latifolia*, Lindl. in Bot. Reg. under t. 1543. *Bragantia* n. sp. Br. in Trans. Linn. Soc. XIII. 219. *Ceramium tomentosum*, Bl. Bijdr. 1135. *Cyclodiscus tomentosus* and *latifolius*, Klotzsch in Monatsb. Berl. Akad. 1859, 592. *Aristoloch.*, Wall. Cat. 9108.

PENANG: Waterfall, Tanjong Tirie and Paya Trobong, *Curtis* 1681!, 2754!. PERAK: *Wray* 3471!. PAHANG: at Kwala Tembeling, *Ridley* 2256!.—DISTRIB. India (Sylhet and Cachar), Burma, Java, Sumatra (Lampongs, *H. O. Forbes* 1672!).

VAR. *lanuginosa*, Hook. f. Leaves densely white-woolly beneath.

KEDAH: Lankawi Island, *Curtis* 1681!. At Kwala, *Yapp* 69!.—DISTRIB. South Andaman Island (*Kurz*).

2. THOTTEA, Rottb.

Shrubs, erect or straggling. *Leaves* alternate, shortly petioled, 3—7-ribbed, nerves and reticulations prominent; stipules 0. *Flowers* usually large, in short axillary cymes. *Perianth* broadly campanulate or urceolate, equally 3-lobed, lobes valvate. *Stamens* biseriate, numerous, with short filaments, inserted round the style-column; anthers extrorse; cells 2, rather distant; connective thick. *Ovary* inferior, elongate, 4-celled; style short, thick, arms 5—20, radiating,

sometimes forked, ending in the stigmas; ovules numerous, 2-seriate in vertical rows from the axis, pendulous. *Capsule* elongate, 4-gonous, septicidally 4-valved; placenta free, central, cruciform in section. *Seeds* oblong, trigonous; testa rugose; albumen fleshy; embryo minute. **DISTRIB.** Species 5, of the Malay Peninsula and Archipelago.

- Perianth funnel shaped, widely open, 6—12 cm. long;
leaves hispid-pubescent beneath; stigmatic rays
8—15; stamens about 15 in each series.. .. 1. *T. grandiflora*.
Perianth urceolate in tube, the lobes spreading,
about 15 cm. long; leaves glabrous beneath;
stigmatic rays 6; stamens about 16 in outer, 10 in
inner series 2. *T. dependens*.
Perianth urceolate, nearly closed, less than 1 cm. long;
leaves hoary-puberulous beneath; stigmatic rays 4—
6; stamens about 12 in outer, 6 in inner series .. 3. *T. tricornis*.

1. *THOTTEA GRANDIFLORA*, Rottb. in Nye Dansk. Vidensk. Selsk. Skrift. II. 530, t. 2 (1783). An erect shrub, reaching 1—2 m. in height; branches stout, woody, villous with spreading hairs, striate, enlarged and jointed at the nodes. *Leaves* coriaceous, distichous; ovate, ovate-oblong or obovate, acute or shortly cuspidate-acuminate at apex, cordate at base; entire, upper surface sparsely villous when young, glabrous when old except on the midrib, lower surface ferruginously hispid-pubescent; 20—30 cm. long, 10—20 cm. broad; midrib conspicuously raised on both surfaces; ribs from the base 2—3 pairs, rather slender, the inner pair scarcely reaching half-way up; main nerves like the ribs 10 to 12 pairs, raised, slightly curved to the margin, joined by prominent more or less parallel transverse nervules and netted reticulation; petiole stout, ferruginous-villous, 5 to 10 mm. long. *Cymes* simple or branched, spicate, from lower nodes, 3—5 cm. long; bracts conspicuous, leafy, lanceolate, densely tawny villous, 1—3 cm. long. *Perianth* large, funnel-shaped, not constricted, membranous, 6—12 cm. long and as broad at mouth, prominently 9-nerved, and reticulate; deep claret-colour with yellow nerves and spots, villous without, cleft in 3 lobes about $\frac{1}{3}$ — $\frac{1}{2}$ down. *Stamens* in two series 15 or more in each; filaments short; anthers short, about 1 mm. long. *Ovary* densely villous below; column of styles thick, glabrous, spreading in 8—15 linear or forked stigmatic rays. *Capsule* 10—15 cm. long, straight or twisted, acute at the angle, pubescent. *Seeds* trigonous, 3—4 mm. long, acute at both ends, tubercled. Griff. in Trans. Linn. Soc. XIX. 325, t. 36; in Notul. IV. 346 and in Ic. Pl. Asiat. t. 530, 531; Ann. Nat. Hist. Ser. 3, VII. 328; Benn. Pl. Jav. Rar. i. 45;

Klotzsch in Monatsb. Berl. Akad. (1859) 589; Duchart. in DC. Prodr. XV. i. 428; Miq. Fl. Ind. Bat. I. 1. 1068; Hook. f. Fl. Br. Ind. V. 74; Ridley in Journ. Str. Br. R. As. Soc. (1900) 127.

PERAK: dense jungle near Ulu Kerling, 150—250 m. alt., *King's Collector* 8770!. MALACCA: *Griffith* K. D. 4439!; *Maingay* K. D. 1318!; at Belimbing, *Hervey*!; *Hullett* 204!; at Bukit Benang, *Curtis* 3662!. SINGAPORE: *Oxley*!; *Lobb* 594!; *T. Anderson* 192!; *Kurz*!; at Selitar and Bukit Mandai, *Ridley* 178!, 4691!. Vern. "Seburut" (*Ridley*).

2. THOTTEA DEPENDENS, Klotzsch in Monatsb. Berl. Akad. 589 (1859). A shrub, reaching 1—2.5 m. in height; branches stout, fistular, glabrous, enlarged, jointed and geniculate at the nodes; internodes terete. *Leaves* distichous, chartaceous; obovate or obovate-lanceolate, cuspidate-acuminate at apex, cuneate at base, entire; glabrous on both surfaces; 15—25 cm. long, 6—12 cm. broad; 5-ribbed from the base, the lower pair slender, short, close to the margin, the upper at first along the midrib and then straight towards the margin ending about half way up, the midrib stout, conspicuous; main nerves from the midrib like the ribs but more widely curved to and along the margin, 8 to 9 pairs, joined by prominent transverse nervules and these again by reticulations; petiole stout, 5—10 mm. long. *Cymes* simple or branched, spicate, often drooping, from near the base of the stems, 5—7 cm. long, minutely puberulous; bracts conspicuous, leafy, lanceolate; rhachis flexuose; buds depressed, triangular. *Perianth* pale yellow with centre and margin streaked with claret-colour; urceolate below for about 1 cm. in height, then erecto-patent and divided into 3 broad cordate acute lobes about 15 mm. long and 25 mm. broad, each 7-nerved and reticulate, glabrous. *Stamens* in two series, the outer ring of about 16, the inner of about 10; filaments slender, 4—5 mm. long; anthers linear, curved, 4 mm. long. *Ovary* elongate, slender, puberulous; column of styles thick, glabrous, spreading in 6 slender stigmatic rays, 3—4 mm. long. *Capsule* slender, 5—10 cm. long, torulose, keeled, constricted between the seeds when dry. *Seeds* trigonous, 3—4 mm. long, acute at both ends, tubercled. Duchart. in DC. Prodr. XV. i. 428; Hook. f. Fl. Br. Ind. V. 74. *Lobbia dependens*, Planch. in Hook. Lond. Journ. Bot. VI. 144, t. 3; Miq. Fl. Ind. Bat. I. i. 1068. *Piper arborescens*, Roxb. ex Wall. Cat. 6648 B.

PENANG: at Waterfall, etc., *Curtis* 1170!, 1507!; at 250—300 m. in dense jungle, *King's Collector* 1661!. PERAK: at Tapa, *Wray* 1318!, 3151!; at Lumut Dinding, *Ridley* 10346!. SINGAPORE: *Wallich* 6648 B.; *Lobb* 289!

3. *THOTTEA TRICORNIS*, Maingay ex Hook. f. in Fl. Br. Ind. V. 74 (1886). A shrub, reaching 1—2 m. in height; branches stout, pale brown, puberulous, swollen and jointed at the nodes, internodes channelled. *Leaves* coriaceous-chartaceous, distichous; elliptic-oblong or -obovate, or -oblanceolate, acute or acuminate at apex, attenuate and rounded at base, entire; upper surface glabrous, lower hoary-pubescent; 20—30 cm. long, 7—13 cm. broad; 5-ribbed from the base, the midrib stout, prominent, the inner pair slender reaching to about two-thirds up and then looped, the outer pair close to the margin, small, looped; main nerves from the midrib 6—8 pairs, curved upwards and joined by many prominent curved transverse nervules and a conspicuous reticulation, all ribs and nerves much raised beneath; petiole stout, twisted, 6—10 mm. long. *Cymes* paniculate, 3—5 cm. long, densely tawny-puberulous; bracts linear or lanceolate, small, lower ones leafy; buds depressed globose, 8 mm. in diam., the top with 3 raised points. *Perianth* urceolate, only slightly open at the mouth in 3 short lobes, grey and red, leathery. *Stamens* in 2 rows, the outer with 12—14, the inner with 6—8; filaments about 1 mm. long; anthers as long, curved. *Ovary* slender, tawny-puberulous; style column thick below, dividing above in 4 to 6 subulate stigmatic arms 1.5 mm. long. *Capsule* 15 to 20 cm. long, quadrangular, tawny-pubescent, 4—5 mm. in diam., not torulose. *Seeds* oblong-trigonal, shortly tubercled, 4—5 mm. long; 2 mm. thick.

PERAK: *Scortechini*, 1952 etc.!; at Goping, *Kunstler* (*King's Collector*) 705!. MALACCA: *Maingay*, K. D. 1319!.

3. *ARISTOLOCHIA*, Linn.

Shrubs or perennial herbs, prostrate or climbing; rhizome often tuberous. *Leaves* alternate, generally petioled, entire or lobed, often with a stipule-like leaf of an undeveloped bud in the axil, otherwise exstipular. *Flowers* solitary or fasciculate or in the leaf-axils, bracts at the bases of the flowers often rather large. *Perianth* very variable in shape, size and colour; usually the tube inflated below, then contracted in a cylindrical neck, then again expanded in a 2-lipped oblique limb, tube usually villous within. *Stamens* 6 (rarely less or more) adnate to and around the style-column with which the filaments and connectives are merged; cells 2, distinct, extrorse. *Ovary* inferior, 6-celled (rarely less or more); placentas parietal or intruded or connivent and connate in the axis; ovules very many, 1—2-seriate, anatropous, in vertical rows; style column thick, divided

above the anthers in a 3—6-lobed stigmatiferous disk. *Capsule* septically 6-valved or splitting through the placentas. *Seeds* numerous, horizontal, often attached to a part of the placenta which comes away with them, more or less flattened; albumen fleshy; embryo minute, close to the hilum, the radicle outwards.—**DISTRIB.** About 180 species, chiefly tropical.

Leaves ovate, acuminate, deeply cordate

Perianth 4—6 cm. long, upper lip of mouth very short or none; capsule 3—4 cm. long, papery; seeds flat, winged, without an adherent placenta 1. *A. Tagala*.

Perianth 1.5 cm. long, upper lip very short, rounded or bifid; capsule thick, rugose, 2.5 cm. long; seeds concave, not winged, rugose, with an attached boat-shaped placenta 2. *A. minutiflora*.

Leaves hastate or prominently and deeply 3-lobed; perianth with upper lip about 3 mm. long 3. *A. Curtisii*.

A. unguifolia, Masters in Journ. Linn. Soc. XIV. 494 (1875); Bot. Mag. t. 7424 is a handsome species of Borneo cultivated in the Singapore Bot. Garden. In Journ. Str. Br. R. As. Soc. (1900) 126, Mr. Ridley includes "*A. unguiflora*, Mast." as "local in long wet grass" at Singapore. His specimen from Jurong is in the Kew Herbarium, but in the doubt whether it is not merely a garden escape, I prefer not to include it among wild Peninsular species. It is also found in Sumatra.

1. **ARISTOLOCHIA TAGALA**, Cham. in Linnæa VII. 207 (1832). An extensively climbing shrub, reaching the tops of trees; branchlets glabrous, grooved, twisted. *Leaves* membranous, glabrous, entire; ovate or ovate-oblong, acute or acuminate at apex, deeply cordate at base with the rounded auricles somewhat convergent; 10—20 cm. long, 5—10 cm. broad; pedately 5—7-ribbed at base, the midrib stout, the inner pair of ribs reaching to above the middle of the blade, the outer pairs spreading or deflexed; main nerves from the midrib 3—5, all joined by a lax reticulation; petiole 3—5 cm. long, often flattened, prehensile. *Flowers* in lax, axillary, puberulous racemes 2—6 cm. long, usually 1 only fertile; bracts small, oblong or ovate, often leafy, up to 1 cm. long. *Perianth* 4—6 cm. long; pale green, the lip marked with claret-brown; the base globose, then curved and slender cylindric for about 1 cm., then expanded in an oblique 2-lipped funnel, the upper lip very short or almost none, the lower produced in a linear apiculate lobe 2—3 cm. long, the funnel and lip and the inside of the globose base villous. *Stamens* 6, in a ring adnate to the column; anther-cells rather distant. *Style*-column surmounted by

an undulate fold; stigmatic lobes conical, beaked, connivent at tip. *Capsule* globose-pyriform or oblong, chartaceous, 3—4 cm. long, transversely linear-rugose between the ribs, 6-celled, the pedicels splitting into 6 segments in fruit. *Seeds* very many, horizontal, flattened, variable in shape but usually obtusely triangular and about 1 cm. in diam., with fragile wings and membranous testa, keeled on one side and tubercular on the other; albumen horny, flat, cordate in shape; embryo very minute, the cotyledons rather shorter than the radicle. Klotzsch in Monatsb. Berl. Akad. 597; Duchart. in DC. Prodr. XV. i. 480; Prain Beng. Plants 591; Cooke Bomb. Fl. II. 524. *A. Roxburghiana*, Klotzsch l.c. 596; Duchart. l.c.; Hook. f. Fl. Br. Ind. V. 75. *A. acuminata*, Roxb. Fl. Ind. III. 489 (not of Lamk.); Wall. Cat. 2705; Wight Ic. t. 771; Miq. Fl. Ind. Bat. I. i. 1066; Dalz. and Gibs. Bomb. Fl. 224.

PENANG: Wallich 2705!; Curtis 2464!; Deschamps!. PERAK: Wray 1439!, 2295!, 3247; King's Collector 2745!, 5000!, 8359!, 10552!, 10577!. SELANGOR: Ridley 7613!. PAHANG: Ridley 2255!. MALACCA: Maingay K. D. 1321!.—DISTRIB. India, Ceylon, Burma, Siam, Java, Sumatra (Forbes 2921!), Philippines.

2. *ARISTOLOCHIA MINUTIFLORA*, Ridley ex Gamble in Kew Bull. 79 (1910). A slender climbing shrub; branches dark brown, corky-barked, sulcate, much twisted; branchlets very wiry, angular. *Leaves* membranous, glabrous, entire; ovate or ovate-lanceolate, acuminate at apex, deeply cordate at base, the auricles rounded somewhat converging inwards, the sinus 1.5 cm. deep and about as much broad; 5—15 cm. long, 3—7 cm. broad, the broadest near the base; pedately 5—7-ribbed at base, the midrib prominent, the inner pair of ribs also prominent and reaching nearly (quite, with loops!) to the apex, the outer pairs very slender, horizontal or deflexed; main nerves 2—3 from the midrib, reticulations faint; petiole slender, twisted, 3—5 cm. long. *Flowers* in lax axillary few-flowered slender puberulous racemes about 1 cm. long; bracts ovate acuminate, sheathing, 3 mm. long, puberulous. *Perianth* in all 1.5 cm. long, red and light grey (Kunstler), the base globose, 3 mm. in diam., followed by a curved tube 3 mm. long, then expanded in a 2-lipped funnel, the upper lip very short, rounded or 2-cleft, the lower produced in a linear twisted lobe 9 mm. long, the whole puberulous. *Stamens* 6, minute, connivent in a ring, the cells obtuse. *Ovary* puberulous, 6-furrowed; style slender, surmounted by a very short column ending in a peltate 6-lobed disk, the lobes conical-apiculate. *Capsule* obovate, 2.5 cm. long, 6-ribbed,

transversely marked by the prominent edges of the seeds. *Seeds* many, pyriform, concave, nearly 1 cm. long, attached to a crustaceous boat-shaped placenta; testa granular-rugose; albumen conform to the seed, fleshy; embryo very minute. Ridley M.S. in Herb. Calc.

PERAK: at Lumut, in dense jungle, *Ridley* 8022!; at Simpiti Dindings, *Ridley* 10259!; at Larut in very moist places, *King's Collector (Kunstler)* 1964!.

VAR. *dolabrata*, Gamble. *Perianth* with the upper lip produced for about 3 mm. and broadened, the lower 1 cm. long; in bud the lips closed up and with the tube having the form of an oblique pickaxe. *Leaves* as in type, always broadest near the base opposite the insertion of the petiole, above that sometimes a little indented. *Flowers* 'french grey, throat dark claret-brown' (Wray); 'lower part dark blue, middle greyish-white, top lighter blue; fruit yellowish-red when ripe' (Kunstler).

PERAK: Maxwell's Hill, *Wray* 2997!; Larut, 900—1100 m., *King's Collector* 2969!.

There are very few flowers available for examination and no fruit. The stamens and column are identical with those of *A. minutiflora* and the leaves are almost exactly the same. The perianth differs, however, and when better material is available, it may prove to be a good species.

3. *ARISTOLOCHIA CURTISII*, King ex Gamble in Kew Bull. 78 (1910). A rather small climbing shrub; branches with corky bark; branchlets wiry, sulcate, twisted, glabrous. *Leaves* chartaceous; younger ones broadly hastate; older ones broad, deeply digitately 3-lobed, the middle lobe oblong lanceolate acuminate mucronate, the side lobes spatulate rounded incurved, base cuneate; both surfaces glabrous, margins entire; hastate young leaves about 10 cm. long by 16 cm. broad, the sinus 1—3 cm. deep, old leaves 10—20 cm. long, 10—30 cm. broad, the sinuses reaching to within 2—6 cm. of the base; nervation pectately flabellate, 3-ribbed at the base; the central rib the midrib of the middle lobe; the outer ribs at first on the margin of the cuneate base, then giving off two interior ribs which form the outer ribs of the middle lobe close to its edges, next giving off one after the other two ribs for the outer lobes and finally itself forming a slender intramarginal rib to the same; the ribs of the outer lobes with few arcuate anastomosing nerves, the whole connected by transverse nervules and a netted reticulation; petiole slender, curved, channelled, 5—10 cm. long. *Flowers* in 1—3, axillary, prominently bracteate, racemes about 5 cm. long; rhachis zigzag; bracts amplexicaul, reddish,

ovate-acuminate, 1—1.5 cm. long; flowers 'velvety dark blue and pink' (*Kunstler*). *Perianth* puberulous, oblong and inflated at base, 1—5 cm. long, narrowed into a short tube 5 mm. long and then expanded in 2 lips; the upper short rounded, 3 mm. long; the lower acuminate, 2—2.5 cm. long. *Stamens* 6, sessile, inserted around the style-column; anther-cells 2, very distinct. *Style-column* short, expanded in a 6-lobed stigmatic disk with short conical tips. *Capsule* oblong, obtuse, 4 cm. long, 6-ribbed, the ribs winged when young. King M.S. in Herb. Calc.

PENANG: Government Hill, *Curtis* 330!; at Waterfall, *G. King*! at 150 m. in dense forest, *King's Collector* (*Kunstler*) 1453!

Family XCIX.—CHLORANTHACEÆ.

Herbs, shrubs or trees, usually aromatic. *Leaves* opposite, usually toothed, the petioles often connate in a sheath; stipules small, subulate, usually on the margin of the sheath. *Flowers* in terminal or pseudo-axillary spikes, heads or panicles; unisexual or the male and female cohering and hermaphrodite supported by a bract; ♂ flowers without perianth, ♀ with a 3-toothed limb adnate to the ovary. *Stamens* 1 or 3, connate; filaments very short and thick; anthers 2-celled, or, if 3 stamens, the side ones 1-celled. *Ovary* 1-celled; style very short; ovule 1, orthotropous, pendulous from the top of the cavity. *Fruit* a small, ovoid or globose, drupe; exocarp fleshy endocarp crustaceous. *Seed* pendulous; testa membranous; albumen copious, fleshy; embryo minute; cotyledons divaricate or scarcely distinct; radicle inferior.—*Distrib.* Genera 3, tropical and subtropical; but not African.

1. CHLORANTHUS, Swartz.

Perennial herbs or shrubs, the stems articulate at the nodes. *Flowers* in terminal simple or panicled spikes; hermaphrodite, the ♂ and ♀ connate on a bract at the base; perianth 0. *Stamens* 1 or 3 confluent; if 3, the central anther 2-celled, the side ones 1-celled. *Ovary* naked; stigma sessile, truncate.—*DISTRIB.* About 10 species, Eastern Asiatic.

Stamens 3, connate by their connectives; leaves finely serrate. 1. *C. officinalis*.

Stamen 1, 4-celled on a broad connective; leaves coarsely

serrate

..

..

..

.. 2. *C. brachystachys*.

1. CHLORANTHUS OFFICINALIS, Blume Enum. Pl. Jav. 79 (1827).

A small erect glabrous undershrub reaching 1—2 m. in height.

Leaves variable in shape and size, usually elliptic or elliptic-lanceolate or elliptic-oblong, acuminate at apex, also usually at base; margin, finely glandular serrate; 7—25 cm. long, 2.5—10 cm. broad; main nerves about 10 pairs, curving upwards and joined by rather prominent but wide reticulations; petiole 0—1 cm. long, each pair joined in a sheath bearing minute subulate stipules. *Inflorescence* 5—13 cm. long; spikes 2.5 to 5 cm. long, slender; bracts sheathing, ovate, acute. *Stamens* 3 connate by their connectives, the middle anther 2-celled, the lateral 1-celled. *Berries* 5 to 6 mm. in diam., globose, white. Fl. Jav. III. 10. t. 1. Solms in DC. Prodr. XVI. i. 474; Miq. Fl. Ind. Bat. I. i. 801; Hook. f. Fl. Br. Ind. V. 100. *C. elatior*, Br. in Bot. Mag. t. 2190. *C. erectus*, Sweet; Wall. Cat. 6881. *Cryphea erecta*, Ham. in Brewst. Ed. Journ. (1825) 11, t. 2.

PENANG: Wallich 6881!. PERAK: Curtis 1180!, 1708!; forests near Larut at about 1000 m. alt., King's Collector 4235!. DINDINGS: Ridley!. MALACCA: Griffith 4396!; Maingay (K. D.) 1337!. SINGAPORE: Hullett 16!.—DISTRIB. N. India, Burma, China, Malay Archipelago, Philippines.

2. *CHLORANTHUS BRACHYSTACHYS*, Blume Fl. Jav. fasc. VIII. 13, 14, t. 2 (1828). A small erect glabrous undershrub reaching 1 m. high or more; branchlets terete. *Leaves* subcoriaceous; lanceolate or elliptic-lanceolate, long acuminate at apex, long attenuate at base; margins coarsely glandular-serrate; 10—20 cm. long, 3—7 cm. broad; main nerves 7—10 pairs, rather irregular; reticulations not prominent; petiole about 1 cm. long, each pair joined in a sheath bearing 2 small linear subulate stipules on either side. *Inflorescence* 3—8 cm. long; spikes 1—2 cm. long, rather dense; bracts small, acute. *Stamen* 1, short, depressed; anther-cells 4, connective broad. *Berries* 5—6 mm. in diam., globose, red. Wall. Cat. 6880; Solms in DC. Prodr. XVI. i. 475; Miq. Fl. Ind. Bat. I. i. 801, and Ann. Mus. Lugd.-Bat. III. 129; Benth. Fl. Hongk. 334; Hook. f. Fl. Br. Ind. V. 100. *C. monander*, Br. in Bot. Mag. t. 2190 in note. *C. ceylanicus*, Miq. l. c. 802. *C. denticulatus*, Cord. in Adans. iii. 296. *Ascarina serrata*, Blume Enum. Pl. Jav. I. 79. *Sarcandra chloranthoides*, Gardn. in Calc. Journ. Nat. Hist. VIII. 348; Wight Ic. t. 1946; Cord. l. c. 301.

PENANG: Wallich 6880!; Government Hill, Maingay (K. D.) 1338!; Curtis 1050!; Deschamps. PERAK: in Batang Padang Valley at about 1000 m. alt., Wray 1479!. PAHANG: Ridley 13710!.—DISTRIB. India (Khasia Hills, Nilgiris, Travancore), Ceylon, China, Malay Archipelago, Philippine Islands.

Family CII. LAURACEÆ.

Erect aromatic trees or shrubs, or (*Cassytha*) leafless twining parasites, usually evergreen. *Leaves* alternate, rarely opposite or sub-opposite, gland-dotted, rarely lobed, the margins entire; stipules 0. *Flowers* regular, small, hermaphrodite or dioecious, in axillary or lateral cymes, clusters, racemes or panicles; bracts 0 or deciduous, often involucriform. *Perianth* usually inferior; tube short, often enlarging in fruit; lobes usually 6, sometimes more, biseriate, imbricate or subvalvate, equal or unequal, one row sometimes wanting, deciduous or persistent in fruit, sometimes enlarged as are often the pedicels. *Stamens* usually a multiple of the perianth-lobes, in 2—4 series on the tube; filaments flattened, those of inner staminal rows usually, of outer sometimes, furnished with a pair of glands; anthers erect, 2—4 celled, the cells dehiscing by upcurved, at length deciduous, valvular lids, the 4th row of stamens often reduced to staminodes: in ♀ flowers the stamens replaced by staminodes, usually linear or clavate, some biglandular as in ♂. *Ovary* sessile at the base of the perianth-tube, 1-celled; ovule solitary, anatropous, pendulous from the top of the cell. *Fruit* a dry or fleshy berry or drupe, naked or rarely enclosed in the perianth-tube or often supported by the more or less enlarged perianth-tube and lobes, the pedicel frequently thickened. *Seed* pendulous; testa membranous; albumen 0; cotyledons plano-convex, fleshy; radicle minute, superior.—DISTRIB. About 900—1000 species in the warmer regions of the world.

Trees or shrubs

Stamens of 3rd row, when present, with extrorse anthers

Anthers 2-celled

Stamens of 3rd row present, those of 1st and

2nd row introrse, if present

Stamens of 1st and 2nd rows present, all

3 rows fertile

Fruit surrounded by the enlarged perianth (Tribe I. CRYPTOCARYEÆ) 1. CRYPTOCARYA.

Fruit seated on the more or less enlarged perianth (Tribe II. APOLONIEÆ)

Perianth-segments equal, deciduous in fruit; fruiting pedicels little or not enlarged .. 2. BEILSCHMIEDIA.

Perianth-segments unequal, the outer 3 smaller, persistent in

- fruit; fruiting pedicels much enlarged 3. *DEHAASIA*.
- Stamens of 1st and 2nd rows absent, of 3rd row sessile (Tribe III. *ACRODILIDIEÆ*) 4. *ENDIANDRA*.
- Stamens of 3rd row absent, those of 1st and 2nd row extrorse (Tribe IV. *MICROPORÆ*) .. 5. *MICROPORA*.
- Anthers 4-celled; fertile stamens 9 (Tribe V. *CINNAMOMEÆ*)
- Leaves usually opposite or subopposite, rarely alternate, usually 3- or more ribbed; fruiting perianth-tube enlarged into a cupule embracing the fruit .. 6. *CINNAMOMUM*.
- Leaves alternate
- Fruiting perianth-tube enlarged
- Fruiting pedicels enlarged, very thick, usually warted; outer perianth-lobes equal to or slightly smaller than inner; anthers ovate-oblong, fairly large; glands large, glabrous like the inner side of the cordate staminodes 7. *ALSEODAPHNE*.
- Fruiting pedicels hardly enlarged; perianth lobes unequal, the 3 outer smaller than the 3 inner; anthers ovate-oblong, very small; glands villous; staminodes ovate, villous on both sides 8. *NOTHAPHCEBE*.
- Fruiting perianth-tube hardly enlarged
- Fruiting perianth-lobes reflexed .. 9. *MACHILUS*.
- Fruiting perianth-lobes erect, cup-like
- Fruiting pedicels short, not enlarged; anthers ovate-oblong; glands large, stipitate; staminodes cordate, stipitate .. 10. *PHCEBE*.
- Fruiting pedicels long, clavate; anthers triangular; glands small or absent; staminodes triangular, sessile .. 11. *STEMMATODAPHNE*.
- All stamens with introrse anthers, the lower cells sometimes lateral
- Anthers 4-celled (Tribe VI. *LITSEÆ*).
- Fertile stamens 9; involucre bracts deciduous in flower; leaves usually subverticillate, 3-ribbed or 1-ribbed, penninerved .. 12. *ACTINODAPHNE*.
- Fertile stamens normally 9 or 12, frequently more, rarely less; involucre bracts persis-

- tent in flower; leaves alternate or sub-opposite, penninerved 13. LITSEA.
- Fertile stamens 6; involucre bracts early deciduous; leaves alternate or subverticillate, 3-ribbed.. .. 14. NEOLITSEA.
- Anthers 2-celled (Tribe VII. LAUREÆ)
- Fertile stamens usually 9 or 12; involucre bracts deciduous or not; leaves alternate or sub-opposite, penninerved or 3-ribbed.. 15. LINDERA.
- Leafless filiform twining parasites with suckers; stamens with 4-celled anthers, outer two rows introrse, inner row extrorse (Tribe VIII. CASSYTHÆ) 16. CASSYTHA.

Tribe I.—CRYPTOCARYÆ.

1. CRYPTOCARYA, R. Br.

Evergreen trees or shrubs. *Leaves* usually alternate, penninerved or 3-ribbed, more or less coriaceous. *Flowers* small, hermaphrodite, in axillary or subterminal pedunculate panicles. *Perianth-tube* turbinate or ovoid, after flowering constricted at the top; lobes 6, subequal. Perfect *stamens* 9, those of the 1st row introrse, opposite the outer 3 lobes of the perianth; those of the 2nd row introrse, opposite the 3 inner lobes; within and alternate with the stamens 6 stipitate glands; slightly within these again the 3 extrorse stamens of the 3rd row opposite the stamens of the 1st row; again, slightly within these, 3 stipitate cordate staminodes opposite the stamens of the 2nd row. *Ovary* sessile at the bottom of the perianth-tube in which it is enclosed; style shortly exserted; stigma obtuse or capitate. *Fruit* wholly enclosed in the perianth-tube which is accrescent, drupaceous, hardened or fleshy, smooth or ribbed, the mouth occluded, the limb deciduous or more or less persistent; pericarp membranous or thinly crustaceous, more or less free from the perianth-tube. *Seed* with a membranous testa often not separable from the pericarp; cotyledons thick, fleshy; radicle minute.—DISTRIB. Species about 40, tropical and subtropical, in both hemispheres.

I have followed Bentham (Fl. Austral. V. 294) and Koorders and Valetton (Bijdr. X. 211) in describing the glands as free and alternate with the stamens of the 1st and 2nd row instead of being attached to those of the 3rd. If a fully open flower is examined it will be seen that the glands are inserted between the stamens of the 2nd and 3rd rows. If such a flower is flattened out carefully and the staminodes and 3rd row stamens removed (they often come away together in a ring), the 6 outer stamens and the 6 glands alternate with

them will be easily apparent. The glands are slightly in front of the 6 outer stamens and slightly behind the 3 inner and the staminodes.

Leaves 3-ribbed (Sect. 1. CARYODAPHNE)

Leaves elliptic-ovate, coriaceous, over 7 cm. long, long-acuminate at apex, margins thin 1. *C. densiflora*.

Leaves orbicular-ovate, very coriaceous, under 7 cm. long, scarcely acute at apex, margins cartilaginous 2. *C. Wrayi*.

Leaves 1-ribbed, penninerved (Sect. 2. EUCRYPTOCARYA)

Leaves with the under surface conspicuously hairy and with net-venation prominent

Leaves usually large; panicles dense; flowers comparatively large

Leaves long-acuminate; bracts long, conspicuous; fruit ovoid-oblong 3. *C. Griffithiana*.

Leaves obtuse, emarginate or shortly acuminate; bracts small, inconspicuous; fruit ellipsoid 4. *C. crassinervia*.

Leaves moderate-sized, never over 15 cm. long and 7 cm. broad; panicles open; flowers small

Leaves elliptic, obtuse or shortly acuminate; fruit spherical, about 1.5 cm. in diameter 5. *C. impressa*.

Leaves oblong or oblong-lanceolate, acuminate; fruit ovoid-flask-shaped about 2 to 2.5 cm. long, 1.5 cm. broad 6. *C. rugulosa*.

Leaves with the under surface slightly hairy, becoming glabrous when old; net-venation fairly prominent

Leaves with under surface glaucescent, minutely puberulous; terminal panicles about 15 cm. long; fruit ovoid or ellipsoid, faintly ribbed, 25 mm. long, 18 mm. broad 7. *C. tomentosa*.

Leaves with under surface reddish, puberulous only when young; terminal panicles about 20 cm. long; fruit ovoid-oblong, 30-35 mm. long, 15 mm. broad 8. *C. ferrea*.

Leaves with the under surface quite glabrous; net venation not much raised

Leaves prominently bluish-glaucous beneath; panicles blackish-tomentose; bracts and bracteoles prominent, linear, up to 1 cm. long 9. *C. bracteolata*.

Leaves merely bluish or greyish beneath; panicles rusty-tomentose; bracts and bracteoles not prominent, small

Leaves 5 to 8 cm. broad or broader, obtuse at apex
Panicle elongate, 20-25 cm. long; transverse nervules of leaves prominent, distant 10. *C. Scortechinii*.

Panicles short, 10-15 cm. long; transverse nervules of leaves inconspicuous, very numerous and close 11. *C. areolata*.

Leaves scarcely 3-6 cm. broad, acuminate at apex.

PERAK: in forest near Larút, *King's Collector* 3605!, 5480!, 10684!—DISTRIB. Java, from 650 to 1500 m. alt.; Borneo (*Haviland* 3333!).

2. *CRYPTOCARYA WRAYI*, Gamble in Kew Bull. 142 (1910). A small tree; branchlets nearly black, minutely puberulous, somewhat angular, lenticellate; buds ovate-acuminate, tawny-puberulous. *Leaves* thickly coriaceous; ovate or orbicular-ovate, shortly and very bluntly acute at apex, truncate at base; upper surface glabrous, shining, lower glaucous and minutely puberulous; 5—7 cm. long, 4—5 cm. broad; 3-ribbed from about 5 mm. above the base with sometimes a minute pair from the base close to the cartilaginous margins, the midrib stout, depressed above, prominent beneath, extending to the apex, the side ribs curved to $\frac{3}{4}$ or $\frac{3}{5}$ of the way and with 3—5 outside nerves; main nerves 2—3 pairs from the midrib, curving upwards to and along the margin; transverse nervules many, arched, indistinct; reticulations minute, areolate on the lower surface; petiole stout, grooved above, 5—10 mm. long. *Flowers* in terminal or axillary rusty-pubescent panicles of cymes up to 3 cm. long, longer in fruit; the rhachis angular; pedicels very short scarcely 1—2 mm. long; buds clavate, 3 cm. long; bracts and bracteoles deciduous. *Perianth*-tube funnel-shaped, 1.5 mm. long; lobes as long as tube, orbicular, rusty-pubescent especially without, the throat of the tube rusty-villous. *Stamens* of 1st and 2nd rows with anthers triangular-ovate, the connective produced in an acute tip, 1.5 mm. long, villous on the rather stout filaments; those of 3rd row rather shorter, the tip more rounded; staminodes triangular acuminate, 1 mm. long, villous on the back, and shortly stipitate; glands glabrous, rounded, .5 mm. long with the short stalk. *Ovary* ovoid-cylindric, slightly villous, produced in a slender style and short capitate stigma. *Fruit* depressed-globose, glabrous, obscurely ribbed, with a short terminal cup of the bases of the perianth-lobes; 2 cm in diam., 1.5 cm. long. *Seed* conform to the fruit; testa membranous; cotyledons thick, the inner face nearly plane, outside rugose.

PERAK: at Gunong Bubu, Larút, 1500 m. alt., *Wray* 3853!

3. *CRYPTOCARYA GRIFFITHIANA*, Wight Ic. t 1830 (1852). A tree, reaching 15 to 25 metres in height and 25 to 75 cm. in diameter of stem; branchlets stout, densely rusty velvety-tomentose. *Leaves* coriaceous; oblong-lanceolate to oblong, long caudate-acuminate at apex, acute or cuneate, sometimes rounded at base; glabrous and

shining on the upper surface when mature except on the midrib which is rusty-tomentose, when young all rusty villous; lower surface glaucous and puberulous, between the densely rusty-tomentose midrib and prominent nervation; 20 to 30 cm. long, 5 to 10 cm. broad; midrib narrow above, broad and prominent below, densely tomentose; main nerves 8 to 12 pairs gracefully arching to and along the margin, deeply impressed above, prominently raised beneath, each pair joined almost horizontally by sub-parallel transverse nervules, also impressed above; petiole stout, 1 cm. long. *Flowers* subsessile, in dense crowded rusty-villous bracteate axillary and subterminal panicles up to 10 cm. long; bracts linear-lanceolate, usually 5 to 10 mm. long, one with two similar smaller bracteoles to each flower. *Perianth*-tube cylindric, slightly constricted at top, 2 mm. long, densely villous without; lobes ovate-oblong, 4 mm. long, densely rusty-villous. *Stamens* of 1st and 2nd row about 2 mm. long with villous filaments and ovate anthers, those of 3rd row rather longer, the connective produced at the top in an acute crest; staminodes of 4th row 1.5—2 mm. long, cordate, apiculate, glabrous in fruit, villous behind; glands shortly stipitate, 1 mm. long. *Ovary* narrowly ovoid, glabrous, glandular-dotted, attenuated into a slender style; stigma obtuse. *Fruit* when young ovoid-oblong, glabrous, obscurely ribbed, attenuated into a ring at top and the boss of the perianth-lobes, when old globose with a flask-shaped mouth 2 cm. long, 1 cm. in diam. *Seed* narrowly ovoid, attenuated into a beak; testa membranous, adherent to the persistent perianth tube; cotyledons thick, inside face plane; radicle conical. Kurz For. Fl. II. 295; Hook. f. Fl. Br. Ind. V. 117; Miq. Fl. Ind. Bat. I. i. 923; Brandis Ind. Trees 527. *C. infectoria*, Miq. var. *caudata*, Meissn. in DC. Prodr. XV. i. 68.

PERAK: at Ulu Bubong and Ulu Kerling, 100–200 m., *King's Collector* 8659!, 10173!, 10999!; hills at 250–300 m. alt., *King's Collector* 10794!; *Scortechini* 510!. SUNGAI UJONG: *Ridley* 2042! MALACCA: *Griffith* 4276!; *Maingay* (K. D.) 1249!; *Kurz*!; at Merliman, etc. *Holmberg* 860!, 890!; *Goodenough* 1568!. JOHORE: at Muar, Biawak, *Curtis* 3614!. SINGAPORE: at Changi, Selitar and Teban, *Ridley* 175!, 427!, 3382!.—DISTRIB. South Tenasserim.

4. CRYPTOCARYA CRASSINERVIA, Miq. Fl. Ind. Bat. I. i, 924 (1855). A tree, reaching a height of 20 to 25 m. and a diameter of stem of 35 to 60 cm.; branchlets stout, subtetragonously angled, densely rusty tomentose as are the inflorescences and the innovations, the hairs of the tomentum unequal. *Leaves* very coriaceous;

elliptic- or obovate-oblong, or oblong-oblancoelate, sometimes almost orbicular; obtuse, emarginate, sometimes mucronate or shortly acuminate at apex, rounded or slightly attenuate at base; margin usually recurved; upper surface shining usually conspicuously bullate, glabrous when mature except on the midrib and nerves; lower surface greyish-rusty-pubescent between the densely rusty tomentose nervation; 10—30 cm. long, 5 to 15 cm. broad; midrib very stout, scarcely raised or impressed on the upper, much raised on the lower surface; main nerves 5 to 10, impressed above, raised beneath, curving upwards to and along the margin and joined by prominent also impressed transverse nervules, and these again by reticulations; petiole stout, 1.5 to 2.5 cm. long. *Flowers* sessile, in stout dense much branched axillary and terminal panicles up to 10 or 15 cm. long; bracts thick, oblong or spatulate, about 4 mm. long, with 2 bracteoles 1 to 2 mm. long to each flower. *Perianth*-tube cylindric, densely rusty-tomentose, 2—5 mm. long; lobes about 4 mm. long, ovate, 3-nerved, grey, the outer slightly acute, tufted hairy near the tip and somewhat longer than the obtuse inner ones. *Stamens* of 1st and 2nd row about 2.5 mm. long, the filaments villous, those of 3rd row as long and with the connective crest-like; staminodes of 4th row cordate acuminate, obtuse at apex, hirsute on the back, .2 mm. long; glands large, 1.5 mm. long, glabrous, villous-stipitate. *Ovary* slender, ending in a long style and obtuse stigma; the young fruit prominently urceolate at first. *Fruit* ellipsoid, black, glabrous and smooth when ripe, ribbed when young, 2 cm. long by 1.5 cm. in diam. *Seeds* conform to the enlarged perianth-tube; testa membranous; cotyledons fleshy. Meissn. in DC. Prodr. xv. i. 69. *C. infectoria*, Miq. var. *β. acuminulata*, Meissn. in DC. Prodr. XV. i, 68.

PERAK: *Scortechini* 217!; at Maxwell's Hill, 1000 m., *Wray* 2962!; about Larút, on low ground and up to 350 m. *King's Collector* 2823!, 4448!, 4670!, 5129!, 5347!, 6037!, 6579!, 6719!, 7935!, 8396!; at Bruas, *Burn-Murdoch*!—DISTRIB. Sumatra (at Fort de Kock, *Teysmann* Herb. Bog. 1007!), Borneo.

This species approaches rather nearly, as hinted by Meissner, to *C. Griffithiana*, but is distinguished by the usually very obtuse, short apiculate or even emarginate leaves, the ellipsoid fruit, the small bracts and the blunt staminodes. It is therefore considered best to maintain it separate, and the long series of specimens of either species with very little tendency to intermediate (*Wray* 2962 is the only one slightly so) seems to support the conclusion. *Burn-Murdoch* gives the Vernacular name "Medang miang."

5. *CRYPTOCARYA IMPRESSA*, Miq. Fl. Ind. Bat. I. i, 923 (1855). A

large tree (Wray); branchlets rather stout, dark brown, the uppermost with the inflorescence and innovations densely finely rusty-tomentose. *Leaves* coriaceous; elliptic, shortly and sharply and abruptly acuminate at apex or sometimes obtuse, attenuate at base; dull and glabrous on the upper surface when mature except on the midrib which is raised and broad and rusty-tomentose, lower surface glaucous and puberulous between the densely rusty-tomentose midrib and prominent nervation; 7 to 15 cm. long, 3 to 7 cm. broad; main nerves 6 to 10 pairs, impressed above, much raised beneath, curved upwards to the margin and joined by subparallel transverse nervules, and these again joined by prominent reticulations; petiole very stout, 2 cm. long. *Flowers* subsessile, in spreading bracteate axillary panicles rarely longer than the leaves; bracts linear, about 2 mm. long, with 2 minute bracteoles. *Perianth*-tube turbinate, 1—5 mm. long, constricted at mouth; lobes ovate-oblong, about 2 mm. long, the inner 3 slightly smaller than the others. *Stamens* of 1st and 2nd row about 1 mm. long, the filaments villous; those of the 3rd row rather longer and with the connective produced in a broad crest; staminodes cordate, glabrous in front, villous behind; glands rounded, villous-stipitate. *Ovary* narrowly ovoid with a slight angle near the top, slightly villous; style slender; stigma briefly trifid; young fruit prominently urceolate and tomentose without. *Fruit* nearly spherical, blackish, puberulous, about 1.5 cm. in diam. Hook. f. *Fl. Br. Ind.* V. 117. *C. infectoria* Miq. var. γ . *opaca*, Meissn. in DC. Prodr. XV. i, 69.

PERAK: at Lower Camp, Gunong Batu Pateh, Wray 1126! MALACCA: Griffith! (K. D.) 4277!; Maingay (K. D.) 1250!. SINGAPORE: in garden jungle, Ridley 4821! or 4921!.—DISTRIB. Sumatra (at Paya Kombo, Teysmann!).

Wray's specimen has smaller leaves than usual, with more obtuse points at apex and less prominent nervation on the upper surface; but I see no reason to doubt it, for some even of Griffith's specimens come very near it.

6. *CRYPTOCARYA RUGULOSA*, Hook f. in *Fl. Br. Ind.* V. 118 (1886). A large tree, reaching 25 to 30 m. in height and a diameter of stem of 60 to 90 cm.; branchlets rather slender, firmly rusty pubescent. *Leaves* coriaceous; oblong or ovate-oblong or oblong-lanceolate, acute or acuminate at apex, cuneate at base; shining and glabrous above even on the nerves, finely rusty-pubescent beneath and greyish in the spaces between the nervules; 5—15 cm. long, 3—6 cm. broad; midrib stout, deeply impressed above, prominent beneath; main

nerves also impressed above and raised beneath, 5 to 10 pairs, curved upwards, and joined by subparallel transverse nervules also impressed above, and these again by a minute network of reticulations; petiole 1 cm. long, usually twisted. *Flowers* very small, pedicellate, in slender rusty pubescent much branched terminal or axillary leafy panicles about as long as the leaves; bracts at base of pedicel oblong, 1.5 mm. long, bracteoles 3 much shorter; pedicels .5 mm. long. *Perianth*-tube cylindrical, constricted at mouth, 1.5 to 2 mm. long; lobes ovate, obtuse, equal, as long as tube, nearly glabrous within. Stamens of 1st and 2nd rows short, anthers ovate, filaments villous, connective glandular dotted; those of 3rd row obtuse, also dotted, and with rather large reflexed crest; staminodes of 4th row cordate acuminate, dotted, villous on the back, .75 mm. long; glands .5 mm. long, stipitate. *Ovary* narrowly ovate, attenuate into the style; stigma obtuse. *Fruit* black, glabrous, ovoid-flask-shaped, acute at apex, 2 to 2.5 cm. long, 1.5 cm. broad. *Seed* conforms to the fruit; testa membranous, dark brown; cotyledons very fleshy.

PENANG: at Muka Head, *Curtis* 958!. PERAK: Road to Bruas Dinding, *Ridley* 8359!; at Lumut Dinding, *Ridley* 10314!; dense forest about Larút at 150—300 m. alt., *King's Collector* 3749!, 5311!, 6279!. MALACCA: *Maingay* (K. C.) 1262!; *Hullett* 664!.

7. CRYPTOCARYA TOMENTOSA, Blume Mus. Bot. Lugd.-Bat. I. i, 335 (1851). A tree reaching a height of 15 to 20 m. and a diam. of 25 to 35 cm.; branchlets brown, rather stout, somewhat angular with prominent rather large lenticels, uppermost and innovations tawny-puberulous. *Leaves* chartaceo-coriaceous; elliptic or oblong-lanceolate, sometimes subovate, shortly acuminate at apex, cuneate attenuate or occasionally rounded at base; upper surface glabrous except on the midrib and main nerves, dull or slightly shining, lower glaucescent, tawny villous on the midrib and nerves minutely puberulous between them, ultimately almost or quite glabrous; 10—20 cm. long, 4—8 cm. broad; midrib stout, slightly impressed above, prominent beneath; main nerves 8 to 15, slightly raised on the upper surface, curving upwards to and along the margin and there sometimes joining in loops, secondary nerves occasional, transverse nervules subparallel, slender, moderately conspicuous as are the reticulations between them; petiole 1 cm. long, puberulous. *Flowers* pedicellate, in axillary or terminal branching grey- or tawny-pubescent panicles shorter than the leaves and about 10 cm. long if axillary, if terminal reaching 15 cm. or more; cymes spreading, corymbose;

bracts and bracteoles minute, caducous; pedicels 1 mm. long. *Perianth*-tube funnel-shaped, 1.5 mm. long; lobes as long, interior of flower only very slightly sericeous, quite as in *C. ferrea* as are the stamens and ovary. *Fruit* ovoid or ellipsoid, black, smooth, ribbed when young, faintly so when old, 25 mm. long, 18 mm. broad, apex truncate, depressed, the base rounded. *Seed* conform to the fruit, 15 mm. long, 10 mm. broad, depressed at apex; testa chartaceous; cotyledons fleshy. Miq. Fl. Ind. Bat. I. i, 923; Meissn. in DC. Prodr. XV i, 71; Koord. and Val. Bijdr. X. 218. *C. glaucescens*, Hassk. Cat. Bog. 89.

PERAK: at Batu Kuran, *Scortechini*!; near Kinta river and elsewhere up to 160 m., *King's Collector* 5744!, 7050!, 7818!, 8776!.—
DISTRIB. Java, Borneo.

var. *rugosa*, Gamble. Panicles with conspicuously rugose branches; leaves glabrous, petioles very thick, 1 to 1.5 cm. long.

MALACCA: at Sungei Hudang, *Derry* 1142! (*Ridley*).

This is a species of whose identification I have felt a little doubtful, the specimen sheets of true *C. tomentosa* at Kew and Calcutta being very few and consisting chiefly of rather young sprays. But I think, to judge from the Calcutta material, both from Java and Borneo, and from the descriptions, that I am right.

8. *CRYPTOCARYA FERREA*, Blume Bijdr. 557 (1825). A tree, reaching 15 to 20 m. in height and 25 to 35 cm. in diam.; branchlets stout, angular, rough and lenticellate, the ultimate ones and the inflorescence minutely rusty-pubescent. *Leaves* chartaceo-coriaceous; oblong or oblong-obovate, sometimes oblong-lanceolate, obtuse at tip with a short acumen, cuneate or alternate at base sometimes rounded; upper surface dull or slightly shining; glabrous, lower pale reddish or cinnamon-brown, puberulous only when young and on the nerves; 10—25 cm. long, 5—10 cm. broad; midrib stout, slightly impressed above, prominent beneath; main nerves 9 to 12, or sometimes 15 pairs, impressed slightly above, the lowest pair small and close to the margin, all gently curving to the margin and joined by prominent rather distant and irregular transverse nervules, which enclose a minutely netted reticulation; petiole 5—10 mm. long, rough, puberulous in young leaves. *Flowers* pedicelled, in axillary or terminal rusty-puberulous panicles, the axillary ones usually shorter than the leaves, the terminal reaching sometimes a length of 20 and breadth of 15 cm., branches spreading, cymes trichotomous; bracts and bracteoles small, ovate-lanceolate, caducous; pedicels about 1 mm.

long. *Perianth*-tube funnel-shaped, 1—5 mm. long; lobes ovate, equal or the inner slightly smaller, 2 mm. long, only slightly pubescent within. *Stamens* of 1st and 2nd series rounded at tip, filaments slightly sericeous, those of 3rd series usually acute at tip; glands subsessile, glabrous, alternate with the outer 6 stamens; staminodes of 4th row cordate acuminate very shortly villous-stipitate. *Ovary* slender, glabrous. *Fruit* ovoid-oblong, 3—3.5 cm. long, 1.5 cm. in diam., attenuate to the slightly truncate apiculate tip, black, smooth; pedicel clavate. Nees Syst. Laurin. 216; Miq. Fl. Ind. Bat. I. i, 921; Meissn. in DC. Prodr. XV. i, 69; Hook. f. Fl. Br. Ind. V. 119; Koord. and Val. Bijdr. X. 216. *C. oblongifolia*, Bl. l. c. 557.; Nees l. c. 215. *C. obscura*, Bl. in Mus. Bot. Lugd.-Bat. I. 335. *C. Mentek*, Bl. in Nees l. c. 218.

PENANG: at Pulau Boetong Reserve, Curtis 2739!. PERAK: about Larút up to 350 m. King's Collector 3909!, 5974!, 6166!, 8562!, 8708!, 8818!, 10976!. MALACCA: at Sungei Udang, Derry 425!; at Bukit Sidwan, Pun Bebas 131!; at Sungei Udang, Good-enough 1358!. JOHORE: Pmerong, Canlley 8!. SINGAPORE: at Choachukang, Ridley 5996!, 8040!.—DISTRIB. Java.

Vern. 'Kayu Medang Kuning' (*Pun Bebas*); 'Medang Merah' (*Good-enough*). In reference to the doubt regarding the identification of this species given in the Fl. Br. Ind., I have compared the descriptions and available specimens of both the Peninsular and Archipelago species and believe it to be correct.

9. *CRYPTOCARYA BRACTEOLATA*, Gamble in Kew Bull. 143 (1910). A tree, reaching 18 to 24 m. in height and 40 to 50 cm. in diam.; branchlets terete, light brown, minutely grey-puberulous; innovations and upper branchlets, also the inflorescence, dark rusty-tomentose. *Leaves* coriaceous; ovate or elliptic, bluntly acuminate at apex, cuneate at base; upper surface dull or very slightly shining, glabrous except the midrib, lower surface bluish-glaucous, almost quite white when dry, the midrib and main nerves tawny-puberulous; 10—18 cm. long, 4—8 cm. broad; midrib rather slender, slightly impressed above; main nerves 6 to 8 pairs, the lowest from very near the base, curved upwards to and along the margin, joined by irregularly subparallel rather distant transverse nervules, and these again by the somewhat prominent reticulations; petiole 1—2 cm. long, twisted. *Flowers* in axillary or terminal long-bracteate blackish tomentose panicles much shorter than the leaves, the axillary ones rarely up to 5 cm. the terminal rather longer; bracts and bracteoles similar, linear, up to 1 cm.

long, the tip inrolled; pedicels 1—2 mm. long. *Perianth*-tube funnel shaped, about 5 mm. long, thickened above; lobes oblong, rounded, 3—5 mm. long. *Stamens* of 1st and 2nd rows with rounded connective and villous filaments; those of 3rd row with connective acute; staminodes cordate-acuminate, penicillate at tip; glands rounded, prominently stalked. *Ovary* and style slender, glabrous: stigma capitate. *Fruit* black, glabrous, depressed-globose, 15 mm. long, 18 mm. in diam., tipped with a conspicuous apex. *Seed* conform with the fruit; testa membranous; cotyledons thick, hemi-spherical.

PERAK: in dense jungle near Larút, on hills from 150 to 450 m. alt., *King's Collector* 6732 !, 7521 !.

10. *CRYPTOCARYA SCORTECHINII*, Gamble in Kew Bull. 143 (1910). A tree reaching 18 to 24 m. in height and a diameter of stem of 40 to 50 cm., branchlets pale brown, angular, puberulous; innovations rusty pubescent. *Leaves* coriaceous; elliptic, elliptic-oblong or elliptic-lanceolate, obtuse or shortly acuminate sometimes long-acuminate at apex, attenuate at base; upper surface somewhat shining, glabrous, reticulate, lower purplish-grey or -glaucescent also glabrous except sometimes for a slight pubescence on the midrib and main nerves; 10—20 cm. long, 5—10 cm. broad; midrib stout, slightly impressed above; main nerves 6 to 9 pairs, curving upwards to meet in loops near the margin and joined by a few irregular transverse nervules and a prominent reticulation, the nerves and reticulation slightly raised above; petiole stout, channelled above, 1—2 cm. long. *Flowers* shortly pedicelled, in axillary or terminal branched panicles reaching 20—25 cm. long, the branches nearly glabrous, the flowers minutely tawny-grey-pubescent; main peduncles about 6 cm. long; cymes spreading, ending in 2 pedicellate with 1 sessile flower; bracts and bracteoles ovate-lanceolate, acute, pubescent; pedicels 1 mm. long. *Perianth*-tube funnel-shaped, 1.5 mm. long; lobes ovate as long as tube, puberulous within. *Stamens* of 1st and 2nd series rounded at top, filaments villous; those of 3rd series narrower, broadly crested at top, filaments villous; staminodes of 4th row cordate acuminate, villous on the back; glands rounded, globose, shortly stipitate. *Ovary* lanceolate, globose, style slender. *Fruit* oblong-ellipsoid, truncate at tip, glabrous, 3 cm. long, 10—15 mm. in diam.; pericarp (enlarged perianth-tube) thick, rugose; pedicels much thickened, rusty-brown. *Seed* oblong, acute; testa membranous, cotyledons fleshy.

PERAK: at Thaiping, *Ridley* 2966!; at Gunong Haram, *Scortechinii*

568!, 619!; near Larút, up to 1500 m. alt., *King's Collector* 6281!, 6297!, 6298!, 6871!, 8686!, 10895!. SUNGHI UJONG: *Ridley* 5849 !.

In its leaves and inflorescence this species strongly resembles *C. Wightiana*, Thwaites, but in its fruit it is quite different; for that of *C. Wightiana* is globose and smooth and has not the very prominently enlarged pedicels. *Ridley's* 5849 has the perianth-tube longer than it is in the other specimens, but this is probably due to the flowers being on the verge of the fruiting stage.

11. *CRYPTOCARYA AREOLATA*, Gamble in Kew Bull. 144 (1910). A large tree, reaching 15 to 20 m. in height and 40 to 50 cm. in diam.; branchlets stout, angular, sparsely rusty puberulous and closely roughly lenticellate, innovations and inflorescence minutely rusty puberulous. *Leaves* coriaceous; ovate or elliptic ovate, the younger sometimes lanceolate, obtusely acute or rounded at apex, rarely acuminate, cuneate and often unequal at base; upper surface smooth, glabrous and somewhat shining, areolate-reticulate, lower glaucous, purplish when dry, glabrous except on the midrib and main nerves; 10 to 20 cm. long, 5 to 8 cm. broad; midrib moderately stout, flattened or somewhat keeled on the upper surface, prominent on the lower; main nerves 5 to 10 pairs, rather distant, the lowest pair close to the margin, all at first more or less straight and then curving to and along the margin, joined by many slender parallel transverse nervules scarcely more conspicuous than the elegantly areolate reticulations between them; petiole curved, 2 cm. long. *Flowers* subsessile, in axillary or terminal rusty-pubescent branching panicles of cymes, 10 to 15 cm. long; bracts and bracteoles ovate-lanceolate, early caducous. *Perianth*-tube cylindrical, 1.5 mm. long; lobes ovate, equal, 2.5 mm. long, pubescent within. *Stamens* of 1st and 2nd rows with villous filaments and broadly crested subacute connective 1—1.5 mm. long, those of 3rd row similar but longer and prominently crested; staminodes of 4th row sagittate, sharply acuminate, 1 mm. long, villous behind and at the base; glands large, rounded and glabrous, villous-stipitate. *Ovary* slender as is the style, slightly angled on one side near the top; stigma capitate. *Fruit* not known.

PERAK: at Sungie Larút, *Wray* 2456!; in open jungle on low-ground at 100—250 m., *King's Collector* 6017!, 6171!, 8630!.

12. *CRYPTOCARYA KURZII*, Hook. f. in Fl. Br. Ind. V. 119 (1886). A small tree reaching 10 to 12 m. in height and with stem 10 to 15 cm. in diameter; branchlets rather slender, terete, lenticellate, gla-

brous except the tawny-puberulous innovations. *Leaves* chartaceous; lanceolate or ovate-oblong or oblong-lanceolate, acuminate at apex, cuneate or acute or rounded at base; upper surface red-brown, shining or dull, glabrous except sometimes on the midrib, lower surface brown-glaucous or bluish-glaucous, sometimes minutely puberulous on the midrib and main nerves; 10—20 cm. long, 3—6 cm. broad; midrib fairly stout, slightly impressed above as are the 7 to 12 pairs of oblique main nerves which are joined by slender inconspicuous subparallel nervules and the minutely netted reticulation; petiole 1—1.5 cm. long, thickened, rugose, nearly glabrous. *Flowers* subsessile, in tawny-pubescent axillary or terminal panicles, the axillary curved and shorter than the leaves, the terminal usually somewhat elongate; bracts and bracteoles minute, caducous. *Perianth*-tube funnel-shaped, 1.5 mm. long; lobes ovate-acute or the inner rounded, sub-equal, sparsely golden-pubescent within, 2 mm. long. *Stamens* of 1st and 2nd rows 1.5 mm. long, connective produced in a membranous subacute tip, filaments villous; those of 3rd row similar but more slender; staminodes of 4th row cordate, acuminate, villous at back and on the short base, 1 mm. long; glands rounded, glabrous, .5 mm. long on villous stalks .25 mm. long. *Ovary* slender, glandular, glabrous; stigma capitate. *Fruit* urceolate when young, when old black, ovoid, acute, reaching about 1.5 cm. long and 1 cm. broad. *C. Wightiana*, *δ. Griffithii*, Meissn. in DC. Prodr. XV. 1. 70 (*excl. the Canara plant*). *C. ferrea*, Kurz For. Fl. II. 295 (*not of Blume*).

PERAK: at Thaipeng, *Wray* 2650; in dense jungle near Larút, *King's Collector* 3042!, 3901!, 5250!, 5320!, 5395!, 6083!, 6571!, 8469!. MALACCA: *Derry* 324!. SINGAPORE: Chanchukang, *Ridley* 3761!, 4134!, 5996!, 6158!.—DISTRIB. Tenasserim, Java, Borneo (*Haviland* 3082!, 3652!).

This species seems, by description, to be very near to *C. acutiflora*, Bl., but it does not agree with the only specimens of the latter that I have seen. I do not feel quite sure I am right in identifying the large available material as belonging to *C. Kurzii*, of which I have only seen two sheets at Kew (*Griffith* 4274 K.D. 1142); but I believe it is correct to do so. I have been a little in doubt about K.C. 6083 as to the possibility of its being the flowering form of *C. argentea*, but I think not.

13. CRYPTOCARYA CÆSIA, Blume Mus. Bot. Lugd.-Bat. I. 335 (1851). A tree; branchlets pale brown, slender, terete, softly tawny-velvety. *Leaves* chartaceous; ovate- or elliptic-oblong, long blunt acuminate at apex, attenuate, often unequally, at base; upper

surface dull, glabrous except on the midrib, lower surface glaucous or glaucescent, minutely puberulous when young, afterwards glabrous; 9—14 cm. long, 3—5 cm. broad; midrib moderately thick, impressed and keeled on the upper surface, prominent on the lower; main nerves 6—8 pairs, impressed above and slightly keeled, raised beneath, curved obliquely upwards to the margin and joined by rather indistinct irregular transverse nervules and a minutely netted reticulation; petiole 1 cm. long, moderately stout. *Flowers* in axillary or terminal tawny-pubescent panicles, the axillary shorter than the leaves, the terminal elongated; branches slender, cymules few-flowered; bracts linear, about 3 mm. long; bracteoles similar but smaller; pedicels none in central flowers, about 1 mm. long in lateral ones. *Perianth-tube* funnel-shaped, 1.5 mm. long; lobes as long, ovate, rounded at tip, slightly tawny-villous within. *Stamens* of 1st and 2nd rows with acute anther connectives and villous filaments; those of 3rd row similar and rather longer; staminodes cordate, acute, villous on the back; glands rounded, glabrous, the pedicel villous. *Ovary* and style slender, glabrous; stigma discoid. *Fruit* globose, smooth, 10—12 mm. in diam., pericarp fleshy. *Miq. Fl. Ind. Bat. I. 1. 925.*

MALACCA: at Sudang Reserve, *Derry* 1144!. SINGAPORE: Chanchukang and Bukit Mandai, *Ridley* 4820!, 6665!.—DISTRIB. Java, Andaman Islands.

Species imperfectly known.

14. *CRYPTOCARYA ENERVIS*, Hook. f. in *Fl. Br. Ind. V. 119* (1886). An evergreen tree (?); branchlets slender, black when dry, glabrous. *Leaves* thinly coriaceous; elliptic-lanceolate, caudate-acuminate at apex, acuminate at base; both surfaces glabrous, brownish green when dry, subglaucous and violet-brown beneath; 7—12 cm. long, 2—4 cm. broad; midrib slender, raised on the upper surface; main nerves 6—8 pairs, faint, curving upwards to and along the margin and there joining in diminishing slender loops; transverse nervules few, irregular, faint as are the reticulations; petiole slender, about 1 cm. long, bordered above by the decurrent margins of the blade. *Flowers* apparently in slender axillary panicles shorter than the leaves, the flowers themselves wanting. *Fruit* globose, smooth, 10—12 mm. in diam., faintly sulcate, tip short, obtuse.

MALACCA: Griffith K.D. 4336!

15. *CRYPTOCARYA BUBONGANA*, Gamble in *Kew Bull. 144* (1910). A large tree, reaching 15 to 20 m. in height and 60 cm. in diam. of

stem; branchlets stout, angular, dark brown, uppermost minutely puberulous. *Leaves* coriaceous; elliptic or elliptic-oblong, shortly acuminate at apex, attenuately rounded often unequally at base; glabrous on both surfaces, dull on the upper; 10—16 cm. long, 3—6 cm. broad; midrib very stout, slightly impressed and keeled on the upper surface, very prominent on the lower; main nerves 6 to 9 pairs, slightly impressed above, very prominent beneath, curved gradually upwards to and along the margin and joined by very slender close subparallel transverse nervules and minutely netted reticulation; petiole curved, slightly puberulous, 10 to 15 mm. long. *Panicles* lateral; few-flowered, stout, shorter than the leaves. *Flowers* not known. *Fruit* globose, glabrous, dark green, black when dry, 10—12 mm. in diameter.

PERAK: open mixed jungle on Ulu Bubong at 150 to 250 m. *King's Collector* 10570!

16. *CRYPTOCARYA ARGENTEA*, Gamble in Kew Bull. 144 (1910). An evergreen tree reaching 15 to 20 m. in height and 37 to 50 cm. in diam. of stem; branchlets slender, pale brown, lenticellate, the uppermost minutely puberulous. *Leaves* coriaceous, often bullate; oblong or oblong-lanceolate, shortly obtusely acuminate at apex, cuneate at base; upper surface bright green when fresh, brown when dry, shining, glabrous, lower silvery-grey when fresh, bluish-glaucous when dry, the nerves puberulous; 8—15 cm. long, 3—6 cm. broad; midrib rather slender, strongly impressed above; main nerves 8—10 pairs, slightly impressed above, curved to near the margin and then meeting in a small loop, joined by irregular transverse nervules and an obscure reticulation; petiole slender, 9—12 cm. long, black when dry. *Flowers* in axillary or terminal slender panicles reaching about 6 cm. in length; only young fruit (ellipsoid, faintly ribbed) known.

PERAK: in dense jungle at 90—180 m. alt., *King's Collector* 7966!

This species comes near to *C. Kurzii*, Hook. f.

Tribe II. APOLLONIEÆ.

2. BEILSCHMIEDIA, Nees.

Evergreen trees or shrubs. *Leaves* alternate or opposite, usually coriaceous, penni-nerved, venose-reticulate. *Flowers* usually small, hermaphrodite, axillary lateral or subterminal, racemose or paniced.

Perianth-tube short; lobes 6, subequal, deciduous after flowering. *Stamens* 9 perfect, with 2-celled anthers, those of the 1st and 2nd rows introrse; those of the 3rd extrorse; staminodes of the 4th row cordate or ovoid, often concave in front, shortly stipitate; glands 6, stipitate, nearly as large as the staminodes, between the 2nd and 3rd row of stamens and rather nearer the latter with which they often come away though not attached to the filaments. *Ovary* sessile, free from the perianth, attenuate into the style; stigma obtuse. *Fruit* an oblong ovoid or globose berry; pedicels not or only thickened below, little at the perianth-ring; perianth quite deciduous leaving a narrow ring; cotyledons fleshy with often a rudimentary dissepiment between them, sometimes ruminant.—DISTRIB. About 20 species, all tropical.

Leaves very coriaceous, brown when dry, 20—35 cm. long, 7—12 cm. broad; flowers in panicles over 10 cm. long.

Leaves oblong, perianth-lobes ovate, 1—5 mm. long; stamens short.. ..

1. *B. insignis*.

Leaves obovate, perianth-lobes oblong, 4 mm. long; stamens rather long

2. *B. Kunstleri*.

Leaves coriaceous, greenish above when dry, 10—20 cm. long, 3—10 cm. broad; flower panicles mostly under 10 cm. long.

Leaves alternate; flowers rather large; perianth-lobes 3 mm. long.

Leaves glabrous on the reddish brown under surface; perianth-tube flattened.. ..

3. *B. malaccensis*.

Leaves villous on the purplish under surface; perianth-tube conical

4. *B. Curtissii*.

Leaves subopposite, rusty-villous; flowers rather large, in panicles 12 cm. long; perianth-lobes 2.5 cm. long

5. *B. Scortechinii*.

Leaves opposite; panicles subglabrous, very slender, up to 6 cm. long; flowers very small.. ..

6. *B. lumutensis*.

Leaves thinly coriaceous or chartaceous, alternate or subopposite.

Flower-panicles dense, under 4 cm. long; perianth-lobes 3 mm. long; leaves reddish-brown when dry

7. *B. Maingayi*.

Flower-panicles spreading, 10—14 cm. long.

Leaves usually shining, greenish on upper surface when dry; main nerves regular, parallel; panicles grey

8. *B. longipes*.

Leaves usually dull, reddish-brown on upper surface when dry; main nerves irregular; panicles reddish

9. *B. perakensis*.

Flowers in very short bracteate racemes; perianth-lobes 1 mm. long; leaves reddish-brown when dry; branchlets white 10. *B. penangiana*.

Species imperfectly known.

Leaves membranous, elliptic or elliptic ovate; fruit up to 15 mm. long 11. *B. membranacea*.
 Leaves chartaceous, lanceolate or oblong-lanceolate; fruit up to 25 mm. long 12. *B. pahangensis*.
 Leaves coriaceous, lanceolate or oblong-lanceolate; fruit 35 mm. long 13. *B. Foxiana*.

1. *BEILSCHIMEDIA INSIGNIS*, Gamble in Kew Bull. 147 (1910).
 A medium-sized tree, reaching 15 to 20 m. in height and 45 to 60 cm. in diameter of stem; branchlets dark brown, stout, glabrous, lenticellate; buds slender up to 1 cm. long with glabrous lanceolate scales. *Leaves* very coriaceous, opposite or alternate; oblong or oblong-ob lanceolate, acute at apex, attenuate at base; both surfaces glabrous, shining, olive-brown when dry; 20—35 cm. long, 7—12 cm. broad; midrib stout, slightly impressed above, keeled beneath when dry; main nerves 10 to 15 pairs slightly impressed above and raised beneath, starting at 50° to 60° with the midrib and curving up to and along the margin where they end in gradually diminishing small loops between the angular transverse nervules, these and the net venation being raised and well marked on the under, less so on the upper surface; petiole stout, channelled above, 20—25 mm. long. *Flowers* in slender axillary panicles up to 12 cm. long; rhachis glabrous, flattened; branches slender with few- (2—3-) flowered cymules; pedicels slender, 2 mm. long. *Perianth*-tube cup-shaped, 1 mm. long; lobes ovate, obtuse, 1.5 mm. long, glabrous on both sides except a slight ring below the stamens. *Stamens* of 1st and 2nd rows 1.5 mm. long, filaments broad, slightly white-villous, connective rounded at apex; stamens of 3rd row similar but longer and rather more slender, the 2 basal glands broad, obtuse, stipitate; staminodes of 4th row cordate, acuminate, concave in front, slightly villous behind, rather longer (.75 mm.) than the glands. *Ovary* ovoid, narrowed into a short style; stigma somewhat bifid. *Fruit* globose, reddish-brown to black, rough, 3—4 cm. in diam., shortly apiculate, the basal ring of the fallen perianth very narrow.

PERAK: in dense jungle on low ground under 30 m. above sea-level, *King's Collector* 6615 !, 8479 !.

2. *BEILSCHMIEDIA KUNSTLERI*, Gamble in Kew Bull. 147 (1910). A large tree, reaching 24 to 30 m. in height and 60 cm. or more in diam. of stem; branches very stout, 1—2 cm. in diam. at the top; bark corky, rough, with prominent leaf-scars; leaf-buds thick, ovoid, scales ovate and rusty-puberulous. *Leaves* very coriaceous, opposite or alternate; obovate or obovate-oblong, rounded or obtusely acute at apex, long cuneate or attenuate at base; both surfaces glabrous, shining, prominently reticulate; margins recurved; 25—35 cm. long, 9—12 cm. broad; midrib stout, impressed on the upper, much raised on the lower surface; main nerves 10—12 pairs, irregular, impressed above, sharply raised beneath, starting at 40°—50° with the midrib and gently curving to and along the margin where they meet in irregular loops; secondary nerves and transverse nervules prominent, irregular as is the prominently raised reticulation; petiole very stout, rough, puberulous, 1·5—2·5 cm. long. *Flowers* velvety dark red, in axillary branching slightly puberulous panicles up to 20 cm. long; the rhachis angular flattened as are the branches; pedicels slender, 1—2 mm. long. *Perianth*-tube very short, flattened; lobes oblong, obtuse, glandular, 4 mm. long, glabrous except a ring below the stamens. *Stamens* of 1st and 2nd rows slender, 2—2·5 cm. long, filaments villous, connective acute, anther cells elongate; those of 3rd row similar, the 2 basal glands rounded stipitate, ·5 mm. long; staminodes of 4th row cordate, acuminate, stipitate, concave in front, slightly villous behind, 1 mm. long. *Ovary* ovoid, gradually attenuate into a rather slender style; stigma obtuse. *Fruit* (young only) obovoid, rugose, glabrous, apiculate, the ring of the fallen perianth-lobes pale, undulate.

PERAK: in dense jungle on low ground near Larút, *King's Collector* 6854!. SINGAPORE: at Bukit Timah, *Bayliss* 5885!.

3. *BEILSCHMIEDIA MALACCENSIS*, Hook. f. in Fl. Br. Ind. V. 123 (1886). A tree; branchlets stout, shining, lenticellate, uppermost angular, innovations and leaf-buds dark purplish rusty-pubescent; buds ovate-lanceolate. *Leaves* coriaceous, alternate; elliptic or elliptic-oblong, obtuse or acute at apex, attenuate often unequally at base; both surfaces glabrous, upper greenish-brown when dry, paler along the nerves, moderately shining, lower reddish-brown; 12—20 cm. long, 6—10 cm. broad; midrib prominent beneath, slightly raised above; main nerves 8 to 12 pairs, slightly depressed above, very prominent beneath, starting at an angle of about 60° with the midrib and curving to and along the margin, the upper ones joining

in prominent loops; secondary nerves often prominent, branching into the prominently widely netted reticulations which are raised on both surfaces when dry; petiole very stout, rough, 1—2 cm. long. *Flowers* in axillary panicles up to 6 cm. long, usually ascending, the peduncle and divaricating branches stout, purplish rusty-pubescent, often flattened; bracts ovate-oblong, caducous; pedicels stout, densely purplish pubescent, 2—3 mm. long; in young fruit the scar of the fallen perianth making a white ring. *Perianth*-tube very short, spreading, flattened; lobes linear oblong, 3 mm. long, sparsely purplish-villous within. *Stamens* slender, those of the outer rows linear, 2 mm. long, pubescent; those of the inner row similar but slightly longer, the glands cordate, .75 mm. long; staminodes also cordate on pubescent filaments, 1—1.5 mm. long. *Ovary* conoidal, glabrous; style slender; stigma small, capitate. *Fruit* not seen. *B. Roxburghiana* β ? *malaccensis*, Meissn. in DC. Prodr. XV. i. 63.

MALACCA: Griffith!; Maingay K. D. 1260!. SINGAPORE: at Bukit Timah, Ridley 4424!

4. *BEILSCHMIEDIA CURTISII*, Gamble in Kew Bull. 148 (1910). A tree, reaching 15 to 20 m. in height; branchlets very stout, densely dark rusty-tomentose; leaf-buds ovoid with pale tomentum on the few scales. *Leaves* coriaceous, alternate; elliptic, rounded at apex with a very short acuminate point, rounded or obtusely acute at base; upper surface shining, olive green when dry, glabrous except on the midrib and main nerves, lower surface dark reddish-brown, rusty-villous throughout, tomentose on the nerves; margins recurved; 15—30 cm. long, 8—13 cm. broad; midrib stout, impressed and often keeled above, prominent beneath; main nerves 10 to 12 pairs, impressed above, prominently raised beneath, leaving the midrib at about 60° and only slightly curving to very close to the margin where they, at any rate the uppermost, join in loops; secondary nerves few, short; transverse nervules rather irregular and distant; reticulations visible on the upper surface as a prominently raised network; petiole very stout, rusty-tomentose, 2—3 cm. long. *Flowers* in short axillary rusty-tomentose corymbose panicles up to about 2.5 cm. long, elongating in fruit; bracts ovate, obtuse, caducous; pedicels rather slender, 1.5—2 mm. long. *Perianth*-tube obconical; lobes ovate or oblong, the outer slightly the larger, prominently rusty hispid-villous, 3—3.5 mm. long. *Stamens* slender, those of the outer rows 1.5—2 mm. long, obtuse, the cells oblong, the filaments villous; those of the third row rather longer but similar, the glands

very short, cordate; staminodes cordate, 1 mm. long, very shortly villous-stipitate. *Ovary* conoidal, glabrous; style slender; stigma small, capitate. *Fruit* oblong or obovoid, nearly black, smooth, 25 mm. long, 12—15 mm. broad, supported by the very narrow ring of the fallen perianth, the pedicels thickened to 3 mm. in diam.; pericarp woody.

PENANG: on Government Hill at 600 m. alt., *Curtis* 1015!;
SINGAPORE: in garden jungle, *Ridley* 8075!

5. *BEILSCHMIEDIA SCORTECHINII*, Gamble in Kew Bull. 148 (1910). A tree; branches stout, their bark dark brown, rough, with large lenticels; branchlets stout, flattened, rusty-pubescent; buds lanceolate, rusty pubescent, 7 mm. long. *Leaves* coriaceous, sub-opposite; oblong-lanceolate, longitudinally folded when young, acuminate at apex, attenuate at base; upper surface glabrous except the midrib, lower rusty-puberulous when young, afterwards glabrescent but still rusty-brown; 12—20 cm. long, 3—5 cm. broad; midrib very stout, scarcely raised on the upper, very much so on the lower, surface; main nerves about 12 pairs, at an angle of about 60° with the midrib, gently curved to join in diminishing loops near the margin; reticulations irregular, very prominent, netted and raised on the upper surface; petiole very stout, rusty-pubescent, 1.5—2.5 cm. long. *Flowers* in axillary rusty-pubescent few-branched panicles reaching 12 cm. long and about 6 cm. broad; peduncle about 6 cm. long, those of branches about 2 cm.; all branches stout and often flattened; pedicels 2 mm. long; bracts and bracteoles very small, caducous; flower-buds globose. *Perianth*-tube campanulate, 1.5 mm. long; lobes oblong, 2.5 mm. long, rusty-villous within. *Stamens* of 1st and 2nd rows stout, 2 mm. long, filaments pubescent, connective obtuse or emarginate at apex; stamens of 3rd row as long as the others but more slender, emarginate at apex, their 2 basal glands rather large cordate stipitate; staminodes of 4th row cordate obtuse, concave in front, pubescent behind, scarcely larger than the glands. *Ovary* puberulous, style rather slender; stigma obtuse. *Fruit* not known.

PERAK: at Caulfield's Hill, 1220 m. alt., *Scortechini* 483! 493!.

6. *BEILSCHMIEDIA LUMUTENSIS*, Gamble in Kew Bull. 148 (1910). An evergreen tree (?); branchlets slender, glabrous, reddish-brown; buds linear, glabrous. *Leaves* coriaceous, opposite, prominently reticulate; elliptic to elliptic-oblong, acute at apex, attenuate at base;

both surfaces glabrous, shining, olive-brown when dry; 10—14 cm. long, 4—6 cm. broad; midrib rather slender, slightly impressed above, raised beneath; main nerves 8—10 pairs, the lowest quite close to the margin, at about 65° with the midrib, curved to anastomose near the margin and joined by an irregular prominent network of reticulation, all raised on both surfaces; petiole 7—12 cm. long, reddish. *Flowers* in axillary glabrous panicles of 4—5 slender elongate branches from a short (about 2—3 mm. long) thick peduncle which sometimes bears leafy branches; the branches 4—6 cm. long, ending in few-flowered cymules; pedicels slender; buds globose; flowers very small, subglabrous. *Perianth*-tube campanulate, glabrous, gland dotted; lobes short, ovate or nearly orbicular, glabrous except for a narrow villous ring at the base of the stamens, tube and lobes together about 1.5 mm. long. *Stamens* of 1st and 2nd row about 1 mm. long, connective acute; those of 3rd row similar, the 2 basal glands rather large; staminodes of 4th row cordate, stipitate, all glabrous, or the filaments slightly villous. *Ovary* ovoid, glabrous, tapering into a short style; stigma obtuse. *Fruit* not known.

PERAK: at Lumut Dinding, *Ridley* 10323!

7. BEILSCHMIEDIA MAINGAYI, Hook. f. in Fl. Br. Ind. V. 123 (1886). A tree: branchlets very stout, the pale brown corky bark marked by longitudinal clefts, prominent leaf scars and very large round lenticels; leaf-buds ovoid with densely rusty-tomentose scales. *Leaves* chartaceous, subopposite, often folded longitudinally; obovate or oblanceolate, abruptly acuminate at apex, narrowly acuminate at base; both surfaces glabrous, reddish-brown when dry; 12—24 cm. long, 4—14 cm. broad; midrib stout, impressed above and keeled; main nerves 7—9 pairs, distant, not very prominent, starting at 60° or less (lowest pair 30°) with the midrib and curving to the margin and along it and joined together by irregular branches and diminishing loops; reticulations irregular, prominent and slightly raised on both surfaces; petiole stout, curved, 1—2.5 cm. long. *Flowers* in dense axillary rusty-tomentose panicles up to 4 cm. long and 3—4 cm. broad; rachis and branches stout, usually flattened; bracts many, conspicuous, ovate, obtuse, densely rusty-tomentose, about 6—8 cm. long; bracteoles small; pedicels very short; buds cordate-globose. *Perianth*-tube very short; lobes ovate, broad, 3 mm. long, villous within. *Stamens* of 1st and 2nd row 1.5 mm. long, filaments thick, flattened, puberulous, anther-cells oblong, apex of connective obtuse; those of 3rd row similar but rather more acute

and 2.5 mm. long, the 2 glands close behind their bases large ovoid, glabrous, shortly stipitate; staminodes of 4th row ovate, obliquely acuminate, concave in front, densely pubescent behind, 1.5 mm. long. *Ovary* ovoid, sparsely villous; style elongate; stigma obtuse. *Fruit* not known.

PERAK: at Gunong Haram, *Scortechini* 727!; at Lumut, *Ridley* 3104!. MALACCA: Maingay K. D. 1268!

King's Collector 4554! and 5445! from Goping, Perak, 150—300 m. alt., may be fruiting specimens of this species. The leaves are rather smaller but have much the same texture and nervation. Should it prove to be so, the following must be added to the description:

Fruit ellipsoid-obovoid, 2.5—3.5 cm. long, 1.5 cm. in diam., somewhat acute at apex with an oblique tip, nearly black, smooth; pedicels enlarged to 5 mm. in diam., rusty-pubescent, ending in the much less enlarged ring of the fallen perianth; pericarp thick, granular.

Wray 1069! from lower Camp, Gunong Batu Pateh, Perak, is also, in all probability, a specimen of the fruit of a species of *Beilschmiedia* near to *B. Maingayi*. It may thus be characterized.

“A small tree; branchlets stout, dark-brown; buds glabrous, lanceolate, 1 cm. long. *Leaves* elliptic or elliptic-oblong, chartaceous, acute at apex, but usually sphacellate, narrowed at base; both surfaces glabrous; 12—20 cm. long, 5—6 cm. broad; main nerves 8—10 pairs, not very prominent, reticulations prominent on both surfaces; petiole 1—2 cm. long, twisted. *Fruit* oblong, oblique, obtuse at apex, up to 6 cm. long and 2 cm. in diam., the pericarp ferruginously rough, scurfy; pedicel greatly thickened.” It cannot be named until the flowers are known.

8. *BEILSCHMIEDIA LONGIPES*, Hook. f. in Fl. Br. Ind. V. 123 (1886). A tree, reaching 15 to 20 m. in height and 40 to 50 cm. in diameter of stem; branchlets ashy-grey, longitudinally ribbed when dry, lenticellate; innovations and lanceolate leaf-buds ashy-grey-puberulous, the latter with few deciduous scales. *Leaves* thinly coriaceous, alternate; elliptic-lanceolate or -oblanceolate, acuminate usually cuspidately at apex, cuneate at base; upper surface shining, glabrous, often olive-green when dry, lower surface ashy-grey or rusty-pubescent, finally glabrate; 15—27 cm. long, 5—10 cm. broad; midrib rather slender, impressed above, raised beneath; main nerves 10—14 pairs, very prominent beneath, at an angle of 40° to 45° with the midrib, at first straight, then curving near the margin, all or only the upper ones joined in loops; transverse nervules and reticulations irregular, usually prominent on the upper surface; petiole stout, 12—20 mm. long. *Flowers* in lax elongate ashy-pubescent panicles reaching 10—13 cm. in length and 5 cm. in breadth; branches few,

alternate, distant, at right angles to the rhachis, bearing few-flowered cymules; bracts linear, short; pedicels 1 mm. long on side flower, 0 in central flowers; flowers yellow. *Perianth*-tube cupshaped, 1—5 mm. long; lobes ovate, rounded, densely grey tomentose without, puberulous within, as long as the tube. *Stamens* of 1st and 2nd rows 1.5 mm. long, filaments puberulous, anthers ovate, connective acute; those of 3rd row more slender and rather shorter, with 2 orbicular stipitate glands a little behind; staminodes of 4th row small, cordate, very shortly stipitate. *Ovary* glabrous; style short; stigma obtuse. *Fruit* (very young only) ovoid, glabrous, apiculate, the scar of the fallen perianth pale.

PERAK: at Sungie Larut, Wray 2291!; *Scortechini*!; forests near Larut chiefly on limestone, at 150 to 450 m. elevation, *King's Collector* 3859!, 4765!, 5465!, 5903!, 7238!, 7325! MALACCA: *Main-gay*, K. D. 1248!

9. BEILSCHMIEDIA PERAKENSIS, Gamble in Kew Bull. 149 (1910). A shrub or small tree reaching 9—12 m. in height and 12—25 cm. in diam. of stem; branchlets slender, dark brown, sparsely pubescent; innovations densely tawny-pubescent as are the ovoid leaf-buds about 5 mm. long. *Leaves* chartaceous, membranous when young, alternate; elliptic or elliptic-obovate, shortly acuminate at apex, cuneate or attenuate at base; upper surface glabrous except on the midrib and main nerves, lower minutely puberulous especially on the nerves, at length nearly glabrous; both surfaces dull when dry, reddish brown; 8—15 cm. long, 4—7 cm. wide; midrib moderately stout, slightly impressed above, raised beneath; main nerves 10 to 12 pairs, usually irregular, starting at about 50° with the midrib and curved to the margin where they connect in loops, joined by rather prominent transverse nervules and reticulations which are conspicuous on the upper surface; petiole stout, densely pubescent, 5—10 mm. long. *Flowers* in slender axillary rusty-pubescent panicles reaching 10—14 cm. in length and scarcely 4 cm. in breadth; peduncle usually long; branches few, generally at right angles to the rhachis; cymules about 3-flowered; bracts and bracteoles linear; pedicels slender, of middle flower almost 0; *Perianth*-tube very short; lobes ovate, obtuse or slightly ovate, 1.5 mm. long. *Stamens* of 1st and 2nd rows slender, 1 mm. long, filaments puberulous, connective rounded; those of 3rd row similar but rather longer, the 2 basal glands ovoid, stipitate; staminodes of 4th row ovate, acute, rather small. *Ovary* oblong; style stout; stigma obtuse. *Fruit* oblong or obovoid, black

when dry, 12—15 mm. long, 7—8 mm. broad; pericarp thick; cotyledons separated by a false dissepiment; pedicels scarcely enlarged; ring of fallen perianth pale.

PERAK: *Scortechini*!; dense jungle on hills at 150—250 m. alt., *King's Collector* 8489!, 10026!, 10432!.

10. *BEILSCHMIEDIA PENANGIANA*, Gamble in Kew Bull. 149 (1910). An evergreen tree, reaching 10—12 m. in height; branchlets white with smooth shining bark, lenticels oblong; buds perulate. *Leaves* subcoriaceous, alternate or subopposite; elliptic or elliptic lanceolate, very obtusely acuminate at apex, acuminate at base; both surfaces glabrous, reddish-brown when dry, upper shining; 7—10 cm. long, 3—4 cm. broad; midrib broad, depressed on the upper surface; main nerves 10—12 pairs, irregular, much branched and joining in loops well within the margin, prominent on both surfaces; transverse nervules also prominent, branched, enclosing the obscure reticulation; petiole broad, .5—1 cm. long, the upper part bordered by the decurrent margins of the blade. *Flowers* in very short axillary bracteate racemes, the buds strobilate with orbicular fimbriate much gland-dotted slightly puberulous bracts, each enclosing one flower supported by two lanceolate acuminate fimbriate bracteoles 1.5 mm. long, the bracts and bracteoles afterwards caducous; pedicels thick. *Perianth*-lobes ovate, obtuse, ciliate, gland-dotted, 1 mm. long, sub-equal. *Stamens* of 1st and 2nd row 1 mm. long, glabrous, on thick filaments; those of 3rd row similar with a pair of suborbicular stipitate glands close to the bases of the filaments; staminodes of 4th row cordate, very shortly stipitate, .5 mm. long. *Ovary* globose, glabrous; style short; stigma obtuse. *Fruit* not known.

PENANG: at Penara Bukit at 300 m. alt., *Curtis* 1098!

Species imperfectly known.

11. *BEILSCHMIEDIA MEMBRANACEA*, Gamble in Kew Bull. 150 (1910). A small tree, reaching 4 to 6 m. in height and the stem 7 to 15 cm. in diameter; branchlets slender, grey, softly blackish-puberulous, innovations rusty-tomentose, as are the small ovoid buds. *Leaves* membranous, alternate; elliptic or elliptic-ovate, obtusely acute at apex, attenuate or slightly and unequally rounded at base; both surfaces olive-green when dry, somewhat shining, glabrous except on the midrib and main nerves; 10—15 cm. long, 5—8 cm. broad; midrib slender, raised on both surfaces; main nerves 9 to 11 pairs, starting at

an angle of about 45° with the midrib and curving to near the margin where they anastomose in irregular loops; reticulations irregularly netted, raised and prominent on both surfaces; petiole thick, pubescent, 5—10 mm. long. *Flowers* not known, apparently in very short axillary cymes. *Fruit* oblong, smooth, up to 15 mm. long and 7 mm. in diameter; pedicel scarcely enlarged.

PERAK: in open jungle at 600 to 900 m. alt., *King's Collector* 10,928!

12. *BEILSCHMIEDIA PAHANGENSIS*, Gamble in Kew Bull. 150 (1910). A tree; branches slender, greyish-brown; branchlets dark brown, glabrous, lenticellate; leaf-buds very small, ovoid with grey-puberulous scales. *Leaves* chartaceous, alternate; lanceolate or oblong-lanceolate, obtusely acute at apex, long-attenuate or -cuneate at base; both surfaces glabrous, prominently reticulate, upper shining; 10—15 cm. long, 3—5 cm. broad; midrib rather slender, slightly raised on both surfaces; main nerves irregular, 10—12 pairs, usually at about 45° with the midrib, at first straight then branching to anastomose near the margin; nervules and reticulations irregular, prominently raised on both surfaces; petiole slender, 1—2 cm. long, rugose. *Flowers* not known, in axillary panicles up to about 6 cm. long; rachises slender. *Fruit* ellipsoid, obtuse at both ends, blackish with raised pale spots on tubercles, 2—2.5 cm. long, 1 cm. broad; cotyledons very fleshy, the false dissepiment membranous.

PAHANG: at Kwala Triang and Suboo Lanjoot, *Ridley* 2273!

13. *BEILSCHMIEDIA FOXIANA*, Gamble in Kew Bull. 150 (1910). An evergreen tree (?); branchlets smooth, thick, lenticellate, greenish-brown. *Leaves* coriaceous, subopposite, prominently reticulate; lanceolate or oblanceolate, bluntly acuminate at apex, long-cuneately narrowed at base; both surfaces dull, glabrous; margin slightly recurved; 12—16 cm. long, 5—7 cm. broad; midrib stout, slightly raised above; main nerves 7 pairs at from 40° — 50° with the midrib, oblique and slightly curved upwards to end close to the margin in a series of diminishing loops which join them; transverse nervules irregular and with the much netted reticulation prominent and more or less raised on both surfaces; petiole stout, 2—2.5 cm. long, the upper part bordered by the decurrent margins of the blade. *Inflorescence* paniculate, much branched, reaching 20 cm. in length, glabrous, the peduncle and its branches with oblong lenticels. *Fruit* ellipsoid, slightly pustular, 3.5 cm. long, 2—2.5 cm. broad; pedicels slightly

enlarged, rusty-brown, rugose; scar of the fallen perianth-tube pale, scarcely enlarged.

PENANG: at Birch's Hill, *Fox* 10705! (Herb. Singap.)

3. DEHAASIA, Blume.

Evergreen trees, the branchlets generally pale, the buds lanceolate. *Leaves* alternate, more or less coriaceous, penni-nerved, often fascicled at the ends of the branchlets. *Flowers* small, hermaphrodite, in axillary peduncled panicles of few-flowered dichasia. *Perianth*-tube very short; lobes 6, the 3 outer much the shortest. Perfect *stamens* 9, small, clavate, the anthers 2-celled; those of the 1st row opposite the outer shorter perianth-lobes, introrse; those of the 2nd row opposite the inner perianth-lobes, introrse; those of the 3rd row opposite those of the 1st row, extrorse, each furnished at the base and a little behind it with 2 rather large sessile glands; staminodes of the 4th row opposite the 2nd row stamens small or wanting, when present usually cordate stipitate. *Ovary* sessile, rounded, attenuate into a short style. *Fruit* an oblong berry, seated on the persistent broadened perianth which is supported by the very much thickened, usually red, often warted, clavate pedicel; cotyledons thick, fleshy; radicle minute.—**DISTRIB.** About 10 species; Indian and Malayan.

- | | |
|--|---------------------------|
| Staminodes of 4th row wanting; leaves chartaceo-coriaceous, over 15 cm. long and 7 cm. broad; flowers about 5 mm. in diam. | 1. <i>D. microcarpa</i> . |
| Staminodes of 4th row present; flowers scarcely 3 mm. in diam. | |
| Leaves chartaceous, lanceolate, not minutely reticulate, not fascicled at the tops of the branchlets .. | 2. <i>D. nigrescens</i> . |
| Leaves coriaceous, more or less obovate, reticulate, fascicled at the top of the branchlets. | |
| Staminodes of 4th row rather large; main nerves of leaves prominently impressed above; panicles pubescent | 3. <i>D. cuneata</i> . |
| Staminodes of 4th row quite small, main nerves not prominently impressed; panicles glabrous | 4. <i>D. Curtisi</i> . |
| Leaves very coriaceous, lanceolate, more or less fascicled; staminodes very small; main nerves and nervules of leaves prominently raised on both surfaces | 5. <i>D. lancifolia</i> . |

1. **DEHAASIA MICROCARPA**, Blume in Rumph. i. 162, t. 44 (1835).
A tree with spreading branches reaching 15 to 25 m. in height and

the stem 40 to 60 cm. in diameter; branchlets rather thick, glabrous, with white shining bark, lenticellate; leaf-buds conical, glabrous, up to 1 cm. long with few black scales. *Leaves* chartaceo-coriaceous, alternate; elliptic-oblong or -obovate or -oblanceolate, acute or acuminate at apex, cuneate or attenuate or sometimes unequally rounded at base; both surfaces glabrous, pale olive-green and shining when dry; 15—40 cm. long, 7—17 cm. broad; midrib stout, broad, prominent beneath; main nerves irregularly spaced, 9—15 pairs, usually 12, the lowest 1 or 2 pairs near the base, the rest more distantly spaced, all curving upwards to and along the margin where they meet in short loops, slightly impressed and keeled on the upper surface, prominent and white on the lower, joined by irregular transverse nervules and indistinct reticulations; petiole rather stout, channelled above, 1—3 cm. long. *Flowers* in erect, glabrous or slightly puberulous, reddish panicles from the upper axils and especially from below the terminal leaf-buds, 10 to 20 cm. long, 5—6 cm. broad; peduncles usually short, angular; branches at right angles to the rhachis, 1—2 cm. long, flattened, dichotomously branched; bracts small, ovate; bracteoles triangular; pedicels clavate, 2—5 mm. long; flower-buds ovoid; flowers yellowish-white. *Perianth*-tube very short, continuous with the pedicel; lobes 6, the outer 3 triangular, 1—1.5 mm. long, the inner 3 ovate, rounded, 2—3 mm. long, all glabrous or very minutely puberulous without. *Stamens* of the first and second rows 2.5 mm. long, filaments broad, white-villous, anthers short, the cells small, connective depressed at tip; stamens of 3rd row similar but rather longer, furnished a little behind their bases with glabrous sessile glands; staminodes of 4th row wanting. *Ovary* and slender style 2.5 mm. long; stigma obtuse. *Berry* black, oblong-ellipsoid, 4 cm. long; 2 cm. broad, seated on the much enlarged trigonous obconic scarlet-warted 2—3 cm. long pedicel which is surmounted by the persistent perianth-lobes; pericarp shining, thin; embryo depressed at apex. Hook. f. Fl. Br. Ind. V. 126; Koord. & Val. Bijdr. X. 201. *D. squarrosa*, Zoll. et Mor. in Zoll. Cat. 113, 115; Hassk. Retz. i. 8; Miq. Fl. Ind. Bat. 929. *Haasia microcarpa*, Nees Syst. Laur. 373; Meissn. in DC. Prodr. XV. i. 60; Miq. l.c. 928. *H. incrassata*, Nees Syst. Laur. 376; Miq. l.c. 930. *Laurus incrassatus*, Jack in Mal. Misc. ii. No. 7. 33 (ex Wall. Cat. 2589). *Persea incrassata*, Nees Syst. Laur. 127. *Machilus incrassatus*, Nees in Wall. Pl. As. Rar. ii. 70,

PERAK: *Scortechini* 1842!; at Gunong Kerbang, *Ridley* 14738!; at Trong, *Wray* 3188!; in dense forest, chiefly on limestone, up to

250 m. alt., *King's Collector* 4950!, 7360!, 7731!, 8204!, 8655!.
 MALACCA: *Griffith* K.D. 4252!; *Maingay* K.D. 1274!; at Panchor,
Goodenough 1264! SINGAPORE: at Turong, *Ridley* 10760!.—DISTRIB.
 Java, Sumatra, Borneo (*Haviland* and *Hose* 3090!, 3091!, 3332!,
 3655!).

2. *DEHAASIA NIGRESCENS*, Gamble in Kew Bull. 150 (1910). A tree, reaching 10—12 m. in height; branchlets slender, greyish-white, uppermost black when dry; leaf-buds black, lanceolate, without scales. *Leaves* chartaceous; lanceolate or oblanceolate, bluntly long-acuminate at apex, attenuate at base; both surfaces dark brown to black when dry, dull on the upper, glabrous; 8—13 cm. long, 3—4 cm. broad; midrib slender; main nerves 8—10 pairs at 40°—50° with the midrib, slender, curving upwards to meet in loops near the margin; reticulations irregular, inconspicuous; petiole slender, 1—2 cm. long. *Flowers* very small, in panicles from the uppermost leaf-axils, slender, glabrous, up to 10 cm. long; peduncle long; branches few, at right angles to rhachis, dichotomous; pedicels clavate; buds globose. *Perianth*-tube cup-shaped, continuous with the pedicel; lobes small, the 3 outer triangular .75 mm. long, the 3 inner twice as long and ovate, all minutely golden-pubescent without, golden-villous within. *Stamens* of 1st and 2nd row clavate, .75 mm. long; connective obtuse; filaments villous; those of 3rd row similar and a little longer having 2 large cordate glabrous glands behind at the base; staminodes of 4th row .5 mm. long, cordate, rather smaller than the glands. *Ovary* globose; style short; stigma obtuse. *Fruit* a black obovate-ellipsoid drupe 2 cm. long by 1 cm. in diam., seated on the enlarged obconical, straight or curved, bright red (when dry—black), pedicel which is surmounted by the persistent perianth-lobes.

PENANG: on Government Hill, at 300 to 600 m. alt., *Curtis* 1183! SINGAPORE: Garden jungle, *Ridley* 13017!

I have taken a long time over the stamens of this species. The material afforded very few flowers and though most of the anthers were distinctly only 2-celled, I found a few which seemed to me to be as clearly 4-celled. The anthers are exceedingly minute and are villous so that it is difficult to examine them, and though I believe I am right in placing it in *Dehaasia*, it is quite possible that fresh specimens examined in the field may make its transfer to *Nothaphæbe* necessary. It is noticeable that *Curtis'* material though all bearing the No. 1183 was certainly collected on different occasions and from different trees, some at 300 m., some at 600 m.

3. *DEHAASIA CUNEATA*, Blume Rumph. I. 164, t. 46 (1835).

A tree, reaching 12 to 15 m. in height and 25 to 40 cm. in diameter; branchlets moderately slender, with white bark, lenticellate; leaf-buds small, conical, tawny-velvety, without scales. *Leaves* coriaceous, variable, fascicled at the ends of the branchlets and the one or two upper joints as if verticillate; obovate, acute obtuse or rarely acuminate at apex, cuneate at base; upper surface black when dry, glabrous except on the midrib and main nerves; lower surface puberulous, glaucous or glaucescent; 7—15 cm. long, 3—7 cm. broad; midrib stout, impressed above, much raised beneath; main nerves 8 to 10 pairs, occasionally more, prominently impressed above and raised beneath, at first at about 45° with the midrib, curved upwards to near the margin where they are joined in gradually lessening loops; transverse nervules few, rather irregular; reticulations minutely areolate, raised on both surfaces; petiole stout, 5—15 mm. long or almost 0, usually bordered by the decurrent margins of the blade. *Flowers* very small, yellowish, in slender blackish puberulous panicles from the upper leaf-axils, up to 10 cm. long and 4 cm. broad; peduncle 4—5 cm. long; branches slender, dichotomous; cymules few-flowered; pedicels clavate, 2—3 mm. long; buds globose. *Perianth*-tube short; lobes ovate, obtuse, the outer three the shortest, puberulous on both sides. *Stamens* minute; those of 1st and 2nd rows clavate, rounded at apex, densely villous, .75 mm. long; those of 3rd row a little longer and with 2 large glabrous glands; staminodes of 4th row rather large, ovate-cordate, glabrous except a tuft of hairs at base, stipitate, .75 mm. long. *Ovary* rounded-conoidal; style almost none; stigma peltate. *Fruit* an ovoid oblong berry, 2—4 cm. long, seated on the enlarged perianth tube and a 2—4 cm. long thick enlarged warted pedicel, which is sometimes curved; pericarp bluish-black, smooth. Hook. f. Fl. Br. Ind. V. 125; Koord. & Val. Bijdr. X. 203. *Haasia cuneata*, Nees Syst. Laur. 378. *Cryptocarya cuneata*, Bl. Bijdr. 558. *Cyanodaphne cuneata*, Bl. Mus. Bot. Lugd. Bat. I. 333; Meissn. in DC. Prodr. XV. i. 76; Miq. Fl. Ind. Bat. I. 926. *C. tomentosa*, Bl. in Mus. Bot. Lugd.-Bat. I. 334; Miq. Fl. Ind. Bat. Suppl. 145. *Alseodaphne grandis*, Kurz For. Fl. II. 293 (not of Nees). *Dictyodaphne?* *Candolleana*, Meissn. in DC. l.c. 80. *Endiandra?* *Candolleana*, Kurz l.c. 295.

PERAK: at Thaiping, Wray 2099!, 2654!, 3101!; in dense low-level forest near Larut, King's Collector, 6745!; at Lumut Dinding, Ridley 3038!—DISTRIB. Burma, Java, Sumatra.

4. DEHAASIA CURTISII, Gamble in Kew Bull. 151 (1910). A

small tree; branchlets rather stout, stiff, rough especially just below the leaves, greyish-white; leaf-buds lanceolate acuminate with glabrous scales. *Leaves* coriaceous, in close fascicles at the ends of the branchlets; obovate, very obtusely acute at apex, long-cuneate at base; both surfaces glabrous and minutely reticulate, the upper dark grey, shining, the lower glaucous; margins recurved; 6—12 cm. long, 3—5 cm. broad; midrib prominent, raised on both surfaces; main nerves 10—12 pairs, raised on both surfaces, at about 70° with the midrib and curved to branch near the margin and so join in loops, joined by the prominently areolate raised reticulation; petiole 1—2 cm. long, black, channelled. *Flowers* very small, in slender dichotomous corymbose pedunculate glabrous panicles from the axils of upper leaves or the scars of fallen ones, about 6 cm. long; peduncles 4—5 cm. long, slightly flattened, branches slender; terminal cymules 3-flowered; pedicels clavate, 2—3 cm. long continuous with the perianth-tube. *Perianth*-tube cup-shaped; lobes ovate, obtuse, the outer three 1—1.5 mm. long, the inner three 1.5—2 mm. long, all slightly pubescent. *Stamens* very small, those of the 1st and 2nd rows .75 mm. long, clavate, villous, the connective emarginate; those of 3rd row similar but more square and a little longer, with 2 rather large glabrous glands at the base just behind; staminodes of 4th row very small, cordate, stipitate, villous behind. *Ovary* ovoid; style slender; stigma obtuse. *Fruit* ellipsoid, black when dry, smooth, 1 cm. long and .75 cm. in diameter seated on the clavate thickened pedicel 5 mm. long.

PENANG: at the Rifle Range, Government Hill, at 750 m. alt., Curtis 1193!. SELANGOR: top of Batu caves, Kelsall 1986!; Ridley!

Ridley's specimen has very small leaves under 5 cm. long and 2 cm. broad, and the small fruit here described, but there seems no reason to consider it other than a low-growing specimen of *D. Curtisii*.

5. *DEHAASIA LANCIFOLIA*, Ridley in Journ. Linn. Soc. XXXIII. 320 (1908). A small tree or large shrub reaching 7—8 m. in height and 28 cm. in diam. of stem; branchlets stout, glabrous, dark reddish brown, uppermost angled by lines decurrent from the leaves; buds very small. *Leaves* very coriaceous, glabrous, somewhat fascicled at the nodes; lanceolate or oblong-lanceolate, obtusely acuminate at apex, cuneate at base; both surfaces glabrous, reddish when dry; 15—20 cm. long, 3.5 to 7 cm. broad; midrib stout, very prominent beneath; main nerves 9—14 pairs, raised on both surfaces, at first straight afterwards curving to meet in loops near the margin; trans-

verse nervules few, irregular, raised on both surfaces enclosing obscure reticulations; petiole stout, 1—1.5 cm. long, bordered in the upper half by the decurrent margins of the blade. *Flowers* in elongate spreading panicles up to 10 cm. long, with few short pubescent branches ending in greenish cymules, the flowers 6—7 together in the cymules with short pubescent pedicels. *Perianth*-tube obconic, very short; lobes nearly glabrous, ovate, the outer 3 much shorter (.75 mm.) than the inner (1.75 mm.). *Stamens* nearly glabrous, those of the 1st and 2nd rows clavate with rounded apices 1 mm. long; those of the 3rd row similar but with a pair of rather large glabrous glands at the back of the filaments; staminodes of the 4th row ovate, .75 m. long, sometimes absent. *Ovary* ovoid, glabrous; style thick, curved; stigma large, thick, capitate. *Drupe* elliptic, 3—4 cm. long, the pedicel only slightly thickened.

PAHANG: on Gunong Tahan at 1500—2000 m. alt., *H. C. Robinson* and *L. Wray* 5468!, 5526.

Tribe III. ACRODICLIDIEÆ.

4. ENDIANDRA, R. Br.

Evergreen trees. *Leaves* alternate, penni-nerved, conspicuously reticulate-areolate, coriaceous; buds small, with leafy scales. *Flowers* small, hermaphrodite, in axillary or subterminal panicles. *Perianth*-tube very short; lobes 6, subequal or the inner rather smaller. *Stamens* of the 1st and 2nd row absent; those of the 3rd row 3, 2-celled, extrorse, thick, sessile, usually connivent over the ovary; staminodes of the 4th row none or minute or replaced by a fleshy ring; glands absent or 6 at the base of the perfect stamens. *Ovary* sessile, usually globose, surrounded by the perianth-tube; style short; stigma capitate. *Fruit* an oblong or subglobose berry, the pedicel sometimes thickened; perianth usually wholly deciduous. **DISTRIB.** About 15 species, Indian, Malayan and Australian.

The Malay Peninsula species all seem to belong to subgenus *Dictyodaphne*, Miq. characterized by the absence of staminodes and glands.

- | | |
|--|-------------------------|
| Leaves under 10 cm. long and 4 cm. broad, glabrous, main nerves 8 to 10 pairs; panicles glabrous | 1. <i>E. Maingayi</i> . |
| Leaves 10 to 13 cm. long and 6 cm. broad, pubescent beneath, main nerves 5—6 pairs; panicles densely tawny-pubescent | 2. <i>E. Kingiana</i> . |
| Leaves over 15 cm. long and usually 10 cm. broad, glabrous, main nerves 8-10 pairs; panicles nearly glabrous | 3. <i>E. præclara</i> . |

Species imperfectly known.

Leaves glabrous, more or less lanceolate, main nerves 5—7

pairs 4. *E. Wrayi*.

1. *ENDIANDRA MAINGAYI*, Hook. f. in Fl. Br. Ind. V. 127 (1886).

A large evergreen tree with spreading branches, reaching 20 to 25 m. in height and 40—50 cm. in diameter; branchlets rather slender, greyish-brown; leaf-buds small, with lanceolate glabrous stipules. *Leaves* coriaceous; elliptic or elliptic oblong, obtusely acute or subcaudately acuminate at apex, cuneate at base; both surfaces minutely areolate, glabrous, shining, reddish-brown when dry; 5—10 cm. long, 2—4 cm. broad; midrib slender, raised on both surfaces; main nerves 8 to 10 pairs, also slightly raised on both surfaces, otherwise inconspicuous, at first straight then curved near the margin to join in faint loops; reticulations prominently areolate; petiole 7—12 mm. long, slender, black, rugose. *Flowers* in short (about 3—4 cm.) axillary subracemose glabrous panicles of few-flowered (about 5) cymules, the rhachises angular, puberulous; pedicels slender, 1 mm. long; buds globose. *Perianth*-tube very short; lobes 2 to 2.5 mm. long, glabrous except a thickened granular-glandular cushion at the base, inner 3 lobes smaller and less imbricated than the 3 outer. *Stamens* thick, conoidal, connivent over the ovary which they enclose, prominently granular-glandular, 1.5 mm. long; anthers sessile, their cells distant, their lids up-curved curled backwards. *Ovary* globose; style short; stigma capitate. *Fruit* oblong or oblong-obovate, glossy black, smooth, 3—5 cm. long, about 2 cm. broad; fruiting pedicel slightly thickened; pericarp rather thin; cotyledons very fleshy.

PERAK: forests near Larút at 150—250 m., *King's Collector* 6103!, 8822!. MALACCA: *Maingay*, K.D. 1270!

2. *ENDIANDRA KINGIANA*, Gamble in Kew Bull. 151 (1910).

An evergreen tree with spreading branches, reaching 15 to 20 m. in height and a considerable diameter; branchlets stout, brown, the bark flaking off, much lenticellate, uppermost glandular-rusty-pubescent; buds short, ovoid, densely pubescent. *Leaves* coriaceous; elliptic, obtusely short-acuminate at apex, acute or cuneate at base; both surfaces shining, minutely areolate, upper glabrous except on the midrib and main nerves, lower softly pubescent, reddish-brown when dry; 10—13 cm. long, 6—7 cm. broad; midrib stout, thickly pubescent, raised on both surfaces; main nerves 5—6 pairs, pubescent and

impressed above, raised beneath, prominent, curved upwards to and along the margin where the upper ones join in loops; secondary nerves few, branching and irregular; reticulations prominently areolate; petiole stout, tawny-pubescent, rugose, 1.5—2 cm. long. *Flowers* in rather dense short (about 3—4 cm.) axillary and terminal thickly tawny-pubescent panicles of few-flowered cymules; pedicels extremely short or none; bracts very small, caducous; buds ovoid; flowers waxy yellowish-brown. *Perianth*-tube very short, tawny-pubescent; lobes imbricate, up to 3 mm. long, ovate-oblong, the outer longer than the inner ones, granular-glandular within especially at the base. *Stamens* thick, conoidal, 1.5—2 mm. long, connivent over the ovary which they enclose, prominently granular-glandular; anthers sessile, cells elongate, the lids up-curved and curled outwards. *Ovary* globose, glabrous, 5 mm. in diam.; style very short; stigma capitate. *Fruit* not known.

PERAK: in dense jungle at 150 to 250 m., *King's Collector* 6487!

Description largely after Sir G. King's notes.

3. *ENDIANDRA PRÆCLARA*, Gamble in Kew Bull. 152 (1910).

An evergreen tree reaching 15 to 20 m. in height and 45 to 60 cm. in diameter of stem, with spreading branches; branchlets stout, smooth, glabrous, striate, dark brown; leaf-buds small. *Leaves* chartaceo-coriaceous; elliptic-obovate or -oblong, shortly obtusely acute or acuminate at apex, cuneate or sometimes rounded at base; both surfaces glabrous, shining, conspicuously and minutely reticulate; 15—40 cm. long, 5—17 cm. broad; midrib stout, slightly depressed above, much raised beneath; main nerves 8—10 pairs, rather irregular, the lowest 1—2 pairs from close to the base and more oblique than the rest, all at first straight then curving gently to and along the margin when they join in a series of short loops; secondary nerves few; transverse nervules not more prominent than the minutely areolate reticulations which are raised on both surfaces; petiole stout, rugose, 10—15 cm. long. *Flowers* rather large, in branching nearly glabrous axillary and subterminal panicles reaching 20 cm. in length and about 10 cm. in breadth; peduncles 0 or very short; rhachis glabrous, flattened; cymules puberulous, few-flowered (about 10); pedicels slender, 1—2 mm. long; flowers light yellow, the buds ovoid, 2—3 mm. in diameter. *Perianth*-tube cup-shaped, puberulous; lobes ovate, the outer three 2.5 mm. long somewhat larger than the inner 3, all glabrous without, granular-glandular at the base within. *Stamens* thick, conoidal, connivent over the ovary which they en-

close, 2 mm. long; connective prominently granular-glandular; anthers sessile, the cells distant, oblong, their lids up-curved and curled backwards. *Ovary* globose; style short, stigma capitate. *Fruit* oblong-ellipsoid, dark red, smooth, 8—10 cm. long, 4 cm. broad; pericarp rather thin; cotyledons very large, fleshy.

PERAK: at Tupai, Wray 3097!; near Larut up to 300 m. alt., King's Collector 4074!, 6714!.

Species imperfectly known.

4. *ENDIANDRA WRAYI*, Gamble in Kew Bull. 152 (1910). A small tree; branchlets slender, brown, lenticellate, uppermost angular, rugose; buds conical, acute. *Leaves* coriaceous; elliptic-oblong or oblanceolate, very obtusely acuminate at apex, acuminate cuneate at base; both surfaces minutely areolate, glabrous, shining; 7—14 cm. long, 2—5 cm. broad; midrib slender, raised on both surfaces; main nerves 5—7 pair, slightly impressed above, very oblique, at first straight then curving to join in loops near the margin; reticulations prominently areolate; petiole slender, 5 to 10 mm. long. *Flowers* in short axillary racemes or panicles, not otherwise known. *Fruit* oblong, black, smooth, 2.5 cm. long by 1 cm. broad, on a rather stout thickened peduncle.

PERAK: at 300 m. in Upper Perak, Wray 3785!.

Wray 2237 from Relan Tujur "a tree with dark green leaves and rusty-brown fruit" agrees as regards leaves fairly well with specimens of *Endiandra rubescens*, Miq. Fl. Ind. Bat. I, 1, 918 in the Kew and Calcutta Herbaria, but the fruit is rather different. It is oblong-ellipsoid, obtuse at apex, rather acute at base, 5—6 cm. long, 2—2.5 cm. broad, the pericarp rusty-brown, furfuraceously netted. Koorders and Valetton describe the fruit of *E. rubescens* as 'subterete or obovate-oblong, obtuse at apex, slightly incurved, oblique and truncate at base, sometimes striolate, 5—7 cm. long, 2—2.5 cm. broad.' A specimen in the Kew Herbarium has the pericarp black and smooth. Without flowers, I hesitate to describe the plant.

Tribe IV. MICROPOREÆ.

5. MICROPORA, Hook f.

A tree with slender branchlets. *Leaves* alternate, penni-nerved, conspicuously reticulate; buds conical with leafy scales. *Flowers* small, hermaphrodite, in axillary few-flowered panicles or racemes. *Perianth*-tube very short, flattened; lobes 6, orbicular, equal. *Stamens* of the 1st and 2nd row 6, exsert, anthers sessile, thick, subquadrate, cells extrorse, distant, opening by two nearly circular pores,

lids upcurved; stamens of the 3rd and 4th rows reduced to short thick staminodes as large as the fertile anthers and produced above them. *Ovary* ovoid, sessile, quite smooth, narrowed into a very short style; stigma minute. *Fruit* ovoid, seated on the persistent and accrescent perianth and stamens.—DISTRIB. One species.

1. *MICROPORA CURTISII*, Hook f. Ic. Plant. t. 1547 (1886). An evergreen tree, reaching 12 to 18 m. in height and 40 to 50 cm. in diameter of stem; branchlets slender, corky, greyish-brown, lenticellate, puberulous; buds long-conical; scales lanceolate, tawny-villous. *Leaves* thinly coriaceous, membranous when young and then black when dry; elliptic, acute at apex, attenuate at base; both surfaces reticulate-areolate, reddish-brown, glabrous except on the midrib beneath; 6—13 cm. long, 3—6 cm. broad; midrib prominent, nearly flat above, raised beneath; main nerves 8 to 10 pairs, curved gently to the margin and there joined by loops, raised on the lower surface, joined by an elegant network of reticulations; petiole 10—20 mm. long. *Flowers* in short few-flowered tawny-puberulous racemes or panicles 2—3 cm. long; bracts lanceolate, 1—2 mm. long; pedicels as long; buds globose, as are the flowers which are 2—2.5 mm. in diam., light yellow when fresh. *Perianth*-tube flat; lobes orbicular, about 1 mm. long, ciliate; stamens and staminodes puberulous and ciliate. *Ovary* glabrous. *Fruit* ovoid, rugose, 3—4 mm. long (immature); accrescent perianth and stamens nearly 2 mm. thick. Hook f. Fl. Br. Ind. V. 862. *Hexapora Curtisii*, Hook. f., l.c. 189.

PENANG: at Government Hill, 300 m., *Curtis* 525!, 1214!; *Ridley* (?) 3153!. PERAK: open jungle near Larut, at 250—300 m. *King's Collector* 5215!. PAHANG: Kwala Triang, Lubu Lanjoot, on the Pahang river (*Ridley* in Trans. Linn. Soc. 2nd Ser. iii, 341).

I have quoted *Ridley's* Pahang citation; but the specimens in the Singapore Herbarium from Kwala Triang (No. 2273) and Lubu Lanjoot are not those of *Micropora*, but of a species of *Beilschmiedia*.

Tribe V. CINNAMOMEÆ.

6. CINNAMOMUM, Blume.

Evergreen trees or shrubs, usually with aromatic bark. *Leaves* opposite, sub-opposite or alternate, 3-ribbed or (Sect. *CAMPHORA*) penninerved. *Flowers* small, hermaphrodite or by abortion polygamous, in axillary or subterminal panicles or sometimes lateral at the base of the youngest shoots, the branches usually ending in dichasia, the

middle flowers of which are the largest and most fertile. *Perianth*-tube short, funnel-shaped, enlarged in fruit; lobes 6, subequal, persistent or partly truncate or deciduous in fruit. *Stamens* 9 perfect or by abortion fewer, anthers 4 or occasionally 2-celled; those of the 1st row opposite the outer perianth-lobes, introrse, eglandular; those of the 2nd row similar, opposite the inner perianth lobes; those of the 3rd row opposite those of the 1st row, extrorse or with lateral anther-cells, the filaments bearing two glands which are sessile or stipitate and usually near the middle, but sometimes at the base and nearly free; staminodes of the 4th row opposite the 2nd row stamens cuneiform cordate or sagittate, stipitate. *Ovary* sessile at the bottom of the perianth-tube and free from it, narrowed into the style; stigma discoid or obscurely 3-lobed. *Fruit* a berry seated on the usually cup-shaped enlarged perianth-tube, the lobes persistent, deciduous or sometimes truncate near their middle. *Seed* conform to the fruit; testa membranous; cotyledons fleshy.—DISTRIB. About 140 species, of tropical and subtropical Eastern Asia, Australia and the Pacific.

Leaves opposite or sub-opposite, with 3 or more ribs; inflorescence buds naked or with small scales; stamens rather large with ovoid or oblong anthers and elliptic cells. perianth-lobes persistent or tube truncate after flowering (Sect. I. MALABATHRUM).

Midrib without main nerves, but with transverse nervules between it and the side ribs.

Leaves glabrous, at any rate when mature.

Flower-panicles very short, slender, glabrous; leaves caudate at apex ..

1. *C. graciliflorum*.

Flower-panicles elongate, puberulous.

Leaves ovate, acute at apex, side ribs scarcely reaching $\frac{3}{4}$ ths of the length of the blade; fruiting perianth large, ribbed, with persistent lobes ..

2. *C. zeylanicum*.

Leaves oblong, side ribs reaching to near the apex.

Side ribs reaching the apex and there joining the midrib, leaves often very large; fruiting perianth small, with persistent lobes

3. *C. iners*.

Side ribs reaching the base of the acumen only.

Acumen attenuately long, very obtuse at tip; inflorescence sparsely puberulous; stamens stout, nearly glabrous

4. *C. Ridleyi*.

Acumen prominent, abrupt.

- obtuse at tip; leaves more than 4 cm. broad, transverse nervules distinct; inflorescence grey-pubescent .. 5. *C. rhyncophyllum*.
- Acumen merely acuminate, almost acute at tip; leaves under 4 cm. broad, transverse nervules indistinct; inflorescence very tawny-pubescent .. 6. *C. lampongum*.
- Leaves lanceolate, acuminate with obtuse apex, side ribs ending 2-3 cm. below apex; fruiting perianth smooth, glabrous, the lobes deciduous .. 7. *C. vimineum*.
- Leaves elliptic, obtuse at apex, side ribs reaching only $\frac{1}{3}$ ths the length of blade 8. *C. Deschampsii*.
- Leaves hairy, at any rate on the under surface
- Leaves large, usually over 12 cm. long.
- Leaves with prominent ladder-like transverse nervules and abrupt acumen; flowers in terminal stout panicles .. 9. *C. javanicum*.
- Leaves without prominent ladder-like transverse nervules, the acumen attenuate; flowers in axillary slender panicles .. 10. *C. mollissimum*.
- Leaves small, usually much under 12 cm. long.
- Leaves with greyish-tawny pubescence, shortly and obtusely acuminate at apex, rounded at base, the side nerves to outer ribs prominent .. 11. *C. Scortechinii*.
- Leaves with golden-tawny pubescence, attenuately long-acuminate at apex, acuminate at base, without side nerves to outer ribs 12. *C. aureo-fulvum*.
- Midrib with several pairs of main nerves; leaves lanceolate, cinereous 13. *C. cinereum*.
- Leaves alternate or rarely subopposite, penninerved, 1-ribbed; inflorescence buds perulate; stamens very small, with rounded obtuse anthers and usually circular anther-cells; perianth-lobes quite deciduous after flowering (Sect. II. CAMPHORA).

Leaves concolorous, pitted in the axils of the

- nerves; filaments as long as or longer than anthers, lower cells elliptic 14. *C. inunctum*.
 Leaves glaucous beneath, not pitted in the axils of the nerves; filaments scarcely as long as anthers, lower cells circular 15. *C. Parthenoxylon*.

1. CINNAMOMUM GRACILIFLORUM, Gamble in Kew Bull. 218 (1910). An evergreen tree (?); branchlets slender, terete, brown, the younger slightly puberulous; leaf-buds lanceolate, grey-pubescent. *Leaves* chartaceous, opposite or subopposite; elliptic, elliptic-ovate or lanceolate, the apex with a long (1—2.5 cm.) caudate acumen obtuse at tip, base acute or slightly rounded; both surfaces glabrous, grey when dry, the upper shining, the lower dull and glaucescent; 7—13 cm. long, 3—6 cm. broad; ribs 3, slightly raised on the upper, more so on the lower surface, usually with a small extra pair starting along or close to the margin and finally forming a slender looped intramarginal ring, the midrib produced to the tip of the acumen, the next pair curved to the base of the acumen and continued in small loops; side nerves outside the pair many joining the sinuses of the intramarginal loops; transverse nervules irregular, arched; reticulation areolate; petiole slender, black, 5—10 mm. long. *Flowers* in very slender few-flowered axillary or lateral racemes up to 4 cm. long; peduncles capillary, glabrous; pedicel scapillary, clavate at tip; flowers 3—5, glabrous without. *Perianth*-tube campanulate, 1 mm. long, glabrous within; lobes ovate-oblong, grey-pubescent within, 2 mm. long. *Stamens* very slender, glabrous except a few scattered bristles and a small tuft at base, 2 mm. long; anthers 4-celled with the upper pair of cells minute, or 2-celled only; those of 1st and 2nd rows with small ovate anthers; those of 3rd row similar and with a pair of reniform or oblong glabrous sessile glands towards the top of the filament; staminodes of 4th row cordate acute. *Ovary* ovoid with a tooth near the top, glabrous; style slender; stigma small, capitate. *Fruit* an ovoid drupe 10 mm. long and about 8 mm. in diameter seated on a glabrous cupule formed of the enlarged perianth-tube bordered by the semi-deciduous lobes, the cupule about 6 mm. in diameter; pedicel also obconically thickened; pericarp yellowish, shining, crustaceous.

PERAK: at Gunong Ijuk, *Scortechini* 1228!; in upper Perak, *Wray* 3664!.

This species resembles in leaf a small-sized var. of *C. rhyncophyllum*; but the flowers are completely different. It seems to come near to *C. Burmanni*, Bl.; but the leaves of that species are thicker and have not the long caudate

acumen. The nearest relation, however, is *C. pauciflorum*, Nees, from which it differs in the thinner more oblong leaves and the side ribs reaching to the very base of the acumen.

2. CINNAMOMUM ZEYLANICUM, Blume Bijdr. 568 (1825). A moderate-sized evergreen tree with rather thick aromatic bark, smooth when young; branchlets terete, dark brown, the uppermost subquad-rangular; leaf-buds ovoid, finely silky. *Leaves* coriaceous, opposite or subopposite; ovate or ovate-lanceolate, acute or obtusely acuminate at apex, acute or rounded at base; both surfaces glabrous; 8—16 cm. long, 4—8 cm. broad; midrib stout, slightly raised above, more so beneath; side ribs 1 or sometimes 2 pairs, when 2 pairs the outer pair slender short close to the margin, the main pair strong at first along-side the midrib for 5—10 mm. then curved to about three-fourths of the length of the leaf when they disappear in faint loops; transverse nervules irregular, rather distant, arched, hardly visible; reticulation under the lens minutely areolate; petiole broad, dark, 1—2 cm. long. *Flowers* numerous, in silky-pubescent lax axillary panicles up to 17 cm. long; peduncles slender, quadrangular, usually glabrous; branches spreading, trichotomous, ending in 3-flowered dichasia; pedicels slender, grey-puberulous; bracts ovate acute, caducous; buds subglobose, grey-puberulous. *Perianth*-tube short, continuing the pedicel, 1—2 mm. long, glabrous within; lobes oblong or ovoid-oblong, the outer rather longer and sometimes spathulate 3—5 mm. long, densely silky within. *Stamens* slender, those of 1st and 2nd rows spathulate, 2—3 mm. long, the filaments slightly pubescent, the anther-cells large slightly overlapping, those of 3rd row with small anthers and a pair of large reniform or oblong glabrous sessile glands about half-way up the slightly puberulous filaments; staminodes of 4th row slender, heads small, cordate-sagittate, filaments nearly glabrous, 1—2 mm. long. *Ovary* ovoid, glabrous; style slender; stigma large, peltate. *Fruit* an oblong or ovoid-oblong berry 15—17 mm. long, 7—8 mm. in diameter seated on and partly immersed in the cupular enlarged perianth and its persistent lobes, the cupule 7—8 mm. in diam., often strongly ribbed; pericarp smooth, brown and shining when dry, purple when fresh. Nees Syst. Laur. 45 and in Wall. Pl. As. Rar. II. 74 and III. 32; Meissn. in DC. Prodr. XV. i. 13; Miq. Fl. Ind. Bat. I. i, 898; Wight Ic. tt. 123, 129, 134; Wall. Cat. 2573; Kurz For. Fl. II. 287; Hook. f. Fl. Br. Ind. V. 131; Trimen Fl. Ceyl. III. 440; Cooke Bomb. Fl. II. 535; Prain Beng. Plants 898; Brandis Ind. Trees 533; Baillon Hist. des Pl. II. 429. t. 240; Engl. & Prantl Naturl. Pflanzenfam. III. ii.

113, t. 73. *Laurus Cinnamomum*, Linn. Sp. Pl. 369; Roxb. Fl. Ind. II. 295.

MALACCA: *Griffith* K.D. 4246—1!; Chin Singh's Plantation (cult), *Maingay* K.D. 4241!. SINGAPORE: *Ridley* 8099 (cult.)!, garden jungle 12595!; *Hullett* 7!; *Caniley* 148!, 207!. The Cinnamon tree.—DISTRIB. South India and Ceylon, elsewhere cultivated only.

This species does not seem to be indigenous in the Malay Peninsula, but it has been cultivated and seems to have run wild. I have quite failed to identify the available specimens with the published varieties.

3. CINNAMOMUM INERS, Reinw. in Blume Bijdr. 570 (1825). A tree, reaching 15 to 20 m. in height and up to 40 cm. in diam. of stem; branchlets terete, dark grey-brown, prominently lenticellate, uppermost appressed-puberulous; leaf-buds conical, grey-silky, 5 mm. long, with small scales; innovations grey-pubescent. *Leaves* chartaceous to coriaceous, opposite or alternate, very variable in size and often sphacelate at apex; elliptic or elliptic-oblong or -lanceolate, sometimes linear-lanceolate or linear-oblong, obtuse or acute at apex, rounded or acute at base, 3-ribbed; both surfaces glabrous when old, slightly puberulous beneath when young, when very young usually ashy-grey-pubescent; upper surface shining, lower dull and pale or almost glaucous; margins usually reflexed, cartilaginous; 6—25 cm. long (sometimes to 40 cm. in young trees and coppice shoots), 2 to 12 cm. broad; midrib stout, raised, straight to the apex, side ribs from the base or leaving the midrib a little above it, uniformly curved to meet it and each other again at the apex; transverse nervules between the mid and side ribs subparallel, horizontal or slightly arched; nerves between the side ribs and margin looped; reticulation under the lens minutely areolate, in old large leaves scarcely seen; petiole 1—2 cm. long, stout, sometimes twisted. *Flowers* yellowish in grey-silky pedunculate subterminal or axillary spreading panicles of variable length from 5 to 25 cm.; branches lax, dichotomous, ending in 3- or 7-flowered dichasia; bracts and bracteoles very small, caducous; pedicels 3—6 mm. long; buds globose. *Perianth-tube* funnel-shaped, 1.5 to 2 mm. long, glabrous within; lobes ovate, acute, 2.5—3.5 mm. long, subequal, sericeous within as without, prominently nerved and dotted, spreading during flowering, then closing up vertically. *Stamens* 2 to 2.5 mm. long, those of the 1st and 2nd rows with ovate anthers with large slightly overlapping cells and slightly villous filaments and connective; those of the 3rd row with

oblong anthers and with two cordate or sagittate stipitate glands from the base or a little above it, the base and the filaments villous; staminodes of 4th row cordate-sagittate, glabrous, 1.5 mm. long, villous-stipitate. Ovary obovoid, rounded at top, glabrous; style slender; stigma large, peltate. Fruit an ellipsoid berry, subtruncated at apex, 10—15 mm. long, 5—7 mm. in diameter, seated on and partly immersed in the cupular enlarged perianth-tube and persistent lobes, the cupule 5 mm. in diameter; pericarp smooth, dull, obscurely ribbed. Blume in Rumph. I. 41, tt. 17, 18; Miq. Fl. Ind. Bat. I. i, 897; Meissn. in DC. Prodr. XI. i, 19 var. *a*; Nees in Wall. Pl. As. Rar. II. 73; Wall. Cat. 2583 E; Wight Ic. t. 122; Kurz For. Fl. II. 287; Hook. f. Fl. Br. Ind. V. 130; Koord. & Val. Bijdr. X. 75. *C. nitidum*, Bl. Rumph. I. 35, t. 15; Hook. f. l.c. *C. Griffithii*, Meissn. l.c. 19. *Laurus nitida* Roxb. Fl. Ind. II. 300; Wall. Cat. 2582 excl. B. *Laurus malabathrum*, Wall. Cat. 2583A.

PENANG: Wallich 2573A!; Phillips!; G. King!; Curtis 156! 1548! 2252!. PROVINCE WELLESLEY: Ridley 9381!. PERAK: various places up to 1400 m. alt. Wray 274!, 556!, 1222!, 2674!, 2768!, 3088!, 3175!, 3328!; King's Collector 425!, 5705!, 6456!, 6510!, 7603!; Scortechini 323!, 1381!. SELANGOR: at Bukit Kuta, Good-enough 10540!; at Kwala Lumpor, Curtis! Ridley 15581!. PAHANG: at Pekan, Ridley 1144. MALACCA: Griffith K.D. 4240!, 4242!, 4246!. Maingay K.D. 1242!, 1243!. SINGAPORE: Hullett 81!; Ridley 3370!, 4703!—DISTRIB. Burma, Java, Sumatra, Borneo, etc.

Kunstler (King's Collector) has sent from Larut his No. 3861! which seems to be undoubtedly this species, but the fruit and fruiting calyx are badly distorted by a fungoid disease.

4. CINNAMOMUM RIDLEYI, Gamble in Kew Bull. 218 (1910). An evergreen tree; branchlets dark purplish-brown, smooth, younger angular and grey-puberulous as are the lanceolate buds. Leaves chartaceous, opposite or subopposite; elliptic-lanceolate, long attenuate-acuminate at apex with a blunt acumen, acute at base; both surfaces glabrous, reddish-brown when dry, the upper shining; margin cartilaginous; 10—17 cm. long, 2.5—6 cm. broad; ribs 3, prominent, the midrib extending to the extreme apex, the side ribs starting from the base or up to about 5 mm. above it and vanishing at the base of the acumination; main nerves none except about 6 pairs arching outside the side ribs; transverse nervules many, subparallel, arched; reticulation obscure; petiole nearly black, 10—15 mm. long. Flowers in grey-tomentose pedunculate axillary or

lateral branching panicles up to 10 cm. long on the upper branchlets; branches subopposite, slender, ending in 7-flowered dichasia; bracts minute, lanceolate, deciduous; pedicels slender; buds obovate. *Perianth*-tube short, villous within; lobes ovate, 2.5 mm. long, villous within. *Stamens* with subglabrous filaments; those of the 1st and 2nd rows 2 mm. long, spatulate, with oblong anthers and small upper cells; those of the 3rd row also 2 mm. long, bearing a pair of cordate sessile glands attached near the middle of the filaments; staminodes of 4th row cordate, 1 mm. long, villous-stipitate. *Ovary* ovoid, glabrous; style slender; stigma peltate, lobed. *Fruit* ovoid, apiculate, 10 mm. long, 7—8 mm. in diameter, seated on the cup-shaped glabrous enlarged perianth-tube about 5 mm. in diam. at mouth, the mouth entire, the lobes deciduous; pericarp black when dry, shining.

SINGAPORE: at Changi road, Ridley 4823!.

This species has puzzled me much: it comes near *C. vimineum* in the acumination of the leaves and in inflorescence it resembles *C. Lampongum* and *C. rhyncophyllum* which are very near each other. The fruiting sheet (Herb. Singap.) bears on its label only 'Singapore' but no collector's name. The leaves resemble those of *C. pauciflorum*, but the inflorescence is quite different.

5. CINNAMOMUM RHYNCOPHYLLUM, Miq. Fl. Ind. Bat. I. i. 895 (1855). A small tree reaching 15 m. in height of stem and a diameter of 30—40 cm.; branchlets slender, subtetragonous, pale brown or greyish, uppermost grey-puberulous as are the conical leaf-buds. *Leaves* chartaceous, opposite or subopposite, aromatic, smelling of cardamoms (Wray); elliptic or elliptic-oblong, the apex with a long (1—2 cm.) straight or oblique acumen obtuse at tip, the base acutely attenuate; both surfaces very pale when dry, glabrous, the upper shining, the lower dull glaucescent; 12—18 cm.* long, 4—6 cm. broad; ribs 3 prominent, the outer pair from the top of the petiole sometimes following the margin for a short distance, then about half-way between the midrib and margin to end just below the acumen; nerves outside this pair many, oblique or not, joining in an intramarginal looped nerve; transverse nervules many, regular, subparallel, slightly arched; reticulation finely areolate; petiole rather stout, 7—14 mm. long. *Flowers* pale yellow, waxy-looking, in grey-tomentose pedunculate axillary branching panicles up to 17 cm. long; branches many, subopposite, slender, ending in 7-flowered dichasia, the middle flowers usually the largest and perhaps alone fruit-bearing; bracts lanceolate, minute, caducous; pedicels slender; buds globose.

Perianth-tube short, villous within; lobes ovate, acute, 3 mm. long, thickened at the back. *Stamens* with villous broad filaments; those of the 1st and 2nd rows 1.5 to 2 mm. long spathulate with ovate anthers and minute upper cells; those of the 3rd row 2 mm. long with oblong anthers and submarginal cells, the upper very minute, the glands obliquely cordate glabrous, very shortly stipitate, attached near the middle of the filaments; staminodes cordate, glabrous within, villous without, 1 mm. long. *Ovary* ovoid-globose; style rather slender; stigma obliquely peltate, 2—3-angled. *Fruit* not seen. Meissn. in DC. Prodr. XV. i. 11.

PERAK: at Tapa, Wray 1304!; in open forest near Larut up to 150 m. alt., *King's Collector* 3287!.—DISTRIB. Sumatra.

6. CINNAMOMUM LAMPONGUM, Miq. Fl Ind. Bat. Suppl. 358 (1862). A medium-sized tree; branchlets slender, terete, uppermost quadrangular, minutely grey-puberulous; leaf-buds conical, grey-silky-pubescent. *Leaves* pergamaceous, opposite or subopposite, yellowish when dry; oblong-lanceolate or elliptic-lanceolate, long acuminate at apex, acute at base; upper surface shining glabrous, lower dull glaucous; 5—15 cm. long, 2—4 cm. broad; ribs three raised on both surfaces, the midrib produced to the tip of the acumen, the side nerves to its base; nerves outside them many, short, united in a looped intramarginal nerve; transverse nervules subparallel, arcuate, indistinct; petiole 5—10 mm. long, dark. *Flowers* in axillary or subterminal grey-brown pubescent panicles up to 12 cm. long, the rhachis quadrangular; branches few spreading, ending in dichasia; pedicels slender. *Perianth*-tube very short; lobes ovate-orbicular, obtuse, 1.5 cm. long, villous within, 5-nerved. *Stamens* small, with very small upper anther-cells and slender filaments; those of 1st and 2nd rows with ovate obtuse anthers; those of the 3rd row with smaller anthers and a pair of large cordate stipitate glabrous glands inserted at the middle of the villous filaments; staminodes of 4th row small, ovate-acuminate, villous-stipitate. *Ovary* ovoid, attenuated into a rather thick style; stigma with 2—3 recurved lobes. *Fruit* ovoid, truncate, 10—12 mm. long, 7—8 mm. in diameter, seated on the enlarged persistent thickened cup-shaped perianth tube 6 mm. long, 10 mm. in diam. crenulate on the margin; pericarp yellowish when dry, smooth, shining.

PERAK: in open jungle up to 240 m. alt. near Larut, *King's Collector* 4802!, 6595!.—DISTRIB. Sumatra (*Teysmann*, *Forbes* 2969!.)

The description of the fruit is taken from K.C. 4802 which has rather smaller and narrow leaves and shorter inflorescence, but seems to be this species.

7. *CINNAMOMUM VIMINEUM*, Nees in Wall. Pl. As. Rar. II. 76 (1831). A small evergreen tree; branchlets slender, terete, reddish brown, glabrous, younger subcompressed, minutely hoary-pubescent as are the innovations. *Leaves* opposite or subopposite, chartaceous; lanceolate, long acuminate at apex with an obtuse acumen, acute at base; both surfaces glabrous, upper shining, lower pale; 8—12 cm. long, 2—4 cm. broad; ribs 3, divergent from the base or slightly above it, the midrib extending to the apex, the side ones to about 2—3 cm. below it; main nerves none; transverse nervules many, irregular, very obscure, enclosing an obscure areolate reticulation; petiole slender, 7—10 mm. long, glabrous. *Flowers* in short lateral few-flowered panicles from the internodes of upper branchlets, glabrous, very small. *Fruit* ovoid, apiculate, 10 mm. long, 7.5 mm. in diam., seated on the cup-shaped glabrous smooth enlarged perianth with smooth margins, this again supported by the obconic glabrous enlarged pedicel 7 mm. long; pericarp smooth, yellow when dry. Nees Syst. Laur. 82; Meissn. in DC. Prodr. XV. i. 19; Miq. Fl. Ind. Bat. I. i. 904; Hook. f. Fl. Br. Ind. V. 131. *Laurus viminea*, Wall. Cat. 2578.

PENANG: Porter!; on West Hill at 750 m. alt., Curtis 1571!

8. *CINNAMOMUM DESCHAMPSII*, Gamble in Kew Bull. 219 (1910). A tree; branchlets slender, terete, dark brown; leaf-buds broadly ovoid, 3 mm. long, densely white-silky. *Leaves* subcoriaceous, opposite or subopposite; elliptic-ovate or -oblong, obtuse at apex and glandular-apiculate, rounded or slightly attenuate at base; both surfaces glabrous, ashy-grey when dry, the upper shining the lower glaucous; margin cartilaginous slightly recurved; 7—11 cm. long, 4—6 cm. broad; ribs 3, slightly raised on the upper surface, the midrib straight to the apical gland, the side pair from the base or very little above it, widely curving upwards to about three-fourths of the distance to the apex where they break into slender loops and sometimes join a single pair of slender nerves; outside nerves about 3, indistinct, widely looped; transverse nervules subparallel, arched, indistinct as is the areolate reticulation; petiole black, 5—10 mm. long. *Flowers* moderate-sized in slender lax pedunculate axillary greyish-silky panicles up to 15 cm. long; peduncles filiform, 4—7 mm. long; branches also filiform ending in dichasia of usually 7 flowers;

pedicels very slender, about 5 mm. long. *Perianth*-tube very short, scarcely 1 mm. long, glabrous within; lobes oblong, acute, 2—3 mm. long, grey-silky-pubescent on both sides. *Stamens* slender, 1—2 mm. long, the filaments nearly glabrous; those of the 1st and 2nd row, with oblong anthers and large cells scarcely overlapping; those of the 3rd row with narrower anthers, the lower cells large the upper minute; the basal glands thick, reniform-cordate, glabrous, stipitates attached a little above the base of the filaments; staminodes of 4th row sagittate, 1 mm. long, villous-stipitate. *Ovary* obovoid; style rather thick; stigma peltate. *Fruit* not seen.

PENANG: roadsides in the mountains, *Deschamps*!. SINGAPORE: in garden jungle, *Ridley* 12595!

Ridley says he believes this to be an introduced plant, perhaps coming from S. India, perhaps from China, but I cannot identify it.

9. CINNAMOMUM JAVANICUM, Blume Bijdr. 570 (1825). An evergreen tree or shrub; branchlets subquadrangular, densely pale tawny-tomentose when young, darker and nearly black when old; buds small. *Leaves* chartaceous, subopposite, very prominently nerved; elliptic or elliptic-oblong, abruptly long acuminate at the apex, cuneate or attenuate at the base; upper surface shining glabrous except on the ribs which are villous when young, bullate between the transverse nervules, lower surface long-villous especially on the ribs and nervules, the hairs pale brown when young darker when old; margin cartilaginous; 17—40 cm. long, 1—12 cm. broad; 3-ribbed from about 5 mm. (1—2 cm. when young) above the base, the ribs very strong and raised on both surfaces, the midrib reaching to the tip of the acumen, the side ribs to a little above its base, outside them and close to the margin a regularly looped intramarginal nerve; transverse nervules many, regular and straight or branched forming ladder-like bars between the ribs and between the outer ribs and the looped nerve, impressed above when young, not so when old; reticulation minutely netted, prominent when young; petiole stout, densely tawny-tomentose, 1—3 cm. long. *Flowers* in tawny-tomentose subsessile fasciculate branched panicles up to 15 cm. long; rhachises quadrangular; branches dichotomous, ending in dichasia; pedicels stout, up to 3 mm. long; buds oblong, up to 5 mm. long. *Perianth*-tube funnel-shaped, 1—1.5 mm. long, thick-walled, pubescent within; lobes ovate-oblong, 3.5—4 mm. long, also pubescent within, the mouth nearly closed. *Stamens* 2 mm. long, the filaments broad villous, the anthers elliptic; those of the

1st and 2nd rows rather larger than those of the 3rd row, the upper cells small; those of the 3rd row bearing a little above the base two large cordate or sagittate glabrous glands; staminodes of the 4th row slender, 1.25 mm. long, the stalk villous, the tip cordate, glabrous. *Ovary* ovoid nearly glabrous; style rather thick, twisted; stigma with 2—3 recurved lobes. *Fruit* subglobose, slightly compressed laterally, about 25 mm. in diam.; pericarp thick, fleshy, the lower half immersed in a thick cupule formed by the enlarged perianth-tube; embryo globose, 15 mm. in diam. Blume Rumph. I. 42, t. 19; Meissn. in DC. Prodr. XV. 1. 10; Hook. f. Fl. Br. Ind. V. 130; Koord. & Val. Bijdr. X. 73. *C. sulphuratum*, Nees in Wall. Pl. As. Rar. II. 74, and Syst. Laur. 55 *in part*; Miq. Fl. Ind. Bat. I. i. 891.

SINGAPORE: at Changi, Ung Mokuo, Bukit Timah and Garden jungle, *Ridley* 6453!, 8101!, 15621!; *Cantley* 22!; *Walker* 29!.
DISTRIB: Java, Borneo (*Teysmann* 8687).

Ridley says flowers of this beautiful plant are very rare; only one of his specimens, without number or locality, possesses them. The description of the fruit is taken from *Koorders* and *Valetou*.

10. CINNAMOMUM MOLLISSIMUM, Hook. f. in Fl. Br. Ind. V. 131 (1886). A large evergreen shrub or small tree reaching 10—12 m. in height and 20—30 cm. in diam. of stem, very aromatic; branchlets slender, subquadangular, brown, lenticellate, puberulous, the uppermost and innovations densely villous with pale golden-brown spreading hairs as are the ovate leaf-buds, 5 mm. long. *Leaves* chartaceous to coriaceous, opposite or subopposite, frequently bullate; elliptic, elliptic-oblong or -lanceolate, attenuately long acuminate at apex and often sphacelate, acute or somewhat rounded at base; upper surface pale green, glabrous except on the ribs of young leaves, lower greyish-villous, ultimately nearly glabrous; margins reflexed; 10—25 cm. long, 2.5—10 cm. broad; ribs three, deeply impressed above, the outer pair from a little (3—7 mm.) above the base, regularly curved almost or quite to the apex; nerves outside these 4—6 on each side obliquely curving to and along the margin and joined in small loops; transverse nervules distant, irregular, branching; reticulation only conspicuous when young; petiole stout, densely villous, 10—15 mm. long, channelled above. *Flowers* cream-coloured, small, in few-flowered long-peduncled densely golden-villous panicles 5—10 cm. long; peduncles at least two-thirds of the length; branches very few, ending in small 7-flowered dichasia; bracts minute, lanceolate; pedicels short; buds globose, grey-

pubescent. *Perianth*-tube campanulate, 2—3 mm. long, white-puberulous within; lobes ovate, acute, 2·3—3 mm. long, the outer very slightly the longer, densely golden-villous within, enlarged and thickened in fruit as is the pedicel. *Stamens* with broad villous filaments; those of the 1st and 2nd rows 1·5—2 mm. long, with oblong anthers and large lower cells, the tip subapiculate; those of the 3rd row as long with narrower anthers, the lower cells opening more or less laterally, the glands obtuse at apex, unequally cordate or sagittate at base, shortly stipitate, attached at the middle of the filaments; staminodes of the 3rd row cordate, glabrous on the inner, villous on the outer side, 1·25 mm. long. *Ovary* ovoid, sparsely pubescent, attenuate into a thick style; stigma obliquely peltate. *Fruit* ovoid, glabrous, black when dry, obtuse at apex, 1—1·5 cm. long, .75 cm. broad, seated on the enlarged thickened calyx-tube which is strongly keeled and glabrescent.

PENANG: at West Hill, *Curtis* 308!. PERAK: at Thaipeng, *Wray* 2669!; in open forest at Larút up to 250 m. alt. *King's Collector* 5568!, 6013!.

11. CINNAMOMUM SCORTECHINII, Gamble in Kew Bull. 219 (1910).

An evergreen tree with thin dark brown fairly smooth bark; branchlets dark brown, terete, the uppermost subquadrangular ferruginous-tomentose; leaf-buds ovoid, densely grey-tomentose. *Leaves* coriaceous, opposite or subopposite; elliptic or elliptic-lanceolate, acute or shortly and obtusely acuminate at apex, somewhat attenuate or rounded at base; upper surface glabrous except on the ribs, lower densely greyish-tawny tomentose; margins reflexed; 7—12 cm. long, 2·5—5 cm. broad; ribs 3, impressed above, the side pair branching from the midrib at from 5—7 mm. above its base, not always opposite, curved upwards to end a little below the apex; nerves outside the side ribs about 3—5 on either side, curved obliquely to the margin and joining in loops; transverse nervules subparallel, slightly arched, in old leaves very indistinct as is the reticulation; petiole stout, tawny-tomentose, 10—15 mm. long. *Flowers* rather large, in few-flowered tawny-pubescent axillary panicles up to 7 cm. long; peduncle slender; branches short bearing a pair of 3-flowered dichasia; pedicels short, about 2 mm. long; buds globose. *Perianth*-tube short, scarcely 2 mm. long, glabrous within; lobes ovate, acute, densely tawny villous within, 2—3 mm. long, the outer slightly the longer. *Stamens* rather thick, with broad pubescent filaments; those of the

1st and 2nd row spatulate, 2—2.5 mm. long, the anther cells large, scarcely overlapping; those of the 3rd row with narrow anthers, the cells opening more or less sideways, the 2 reniform glabrous glands sessile about half-way up the filaments; staminodes of the 4th row sagittate, 1.5—2 mm. long, broadly pubescent-stipitate. *Ovary* obovoid, villous, rounded at top; style rather thick, villous; stigma peltate. *Fruit* (immature) an ovoid berry seated on the persistent cupshaped perianth-tube, truncate at the mouth.

PERAK: at camp on Ulu Batang Padang at 1500 m. alt. *Wray* 1520!; *Scortechini* 322!.

Wray's specimens have rather thicker and smaller leaves than *Scortechini's* and are grey while the latter are reddish but they agree in shape, nervation and pubescence; the difference being probably only due to difference of level.

12. CINNAMOMUM AUREO-FULVUM, Gamble in Kew Bull. 220 (1910). A bush; the branchlets slender, uppermost angular, densely golden-tawny-pubescent as are the innovations. *Leaves* subcoriaceous subopposite; elliptic-lanceolate, attenuately long-acuminate at apex, acuminate at base; upper surface dull, softly appressed grey-pubescent, lower densely golden-tawny-pubescent; 6—8 cm. long, 1.5—3 cm. broad; 3-ribbed from about 3—5 mm. above the base, the midrib reaching to the tip of the acumen, the side ribs scarcely to its base; transverse nervules subparallel, arched, obscure because hidden in the pubescence; petiole slender, 1.5—2.5 cm. long, densely pubescent. *Flowers* in slender tawny-pubescent peduncled dichasia from the axils of upper leaves and up to 4 cm. long; peduncle about 3 cm. long; branches about 1 cm., flattened; bracts caducous; pedicels 2 mm. long; buds ovoid. *Perianth*-tube campanulate, 1 mm. long, articulate with the oblong rounded 2 mm. long subequal lobes, all tawny-pubescent. *Stamens* small, 1.5—2 mm. long; filaments broad, villous; anthers ovate, the upper cells very small, those of the 3rd row bearing half-way up the filaments a pair of rather large reniform glabrous glands; staminodes of the 4th row 1.25 mm. long, the tip cordate, the stalk pubescent. *Ovary* subglobose, wrinkled, sparsely hispid; style slender; stigma acute. *Fruit* not known.

SELANGOR: at Hulu Semangko, on top of the hill, *Ridley* (?) 12103!, 15598!.

13. CINNAMOMUM CINEREUM, Gamble in Kew Bull. 220 (1910). A tree reaching 15—20 m. in height and the stem with a diameter of 40—

50 cm.; branches spreading; branchlets slender, terete, glaucous-grey. *Leaves* sub-coriaceous, undulate, opposite or sub-opposite; lanceolate, acute at apex, subcuneate at base; both surfaces glabrous, the upper shining dark green when fresh, olive green when dry, the lower grey-cinereous as are the young leaves on both sides; margins cartilaginous; 8–15 cm. long, 3–5 cm. broad; ribs 3, the midrib slender in young, strong in old leaves, the side pair branching from the midrib at from 5 to 15 mm. above the base, sometimes not quite opposite, curving to about $\frac{2}{3}$ of the length of the blade and then joined by the main nerves and breaking up into loops; main nerves from the midrib about 4–6 pairs, rather obscure; reticulation prominently areolate in young leaves, hardly apparent in old ones; petiole rather stout, 1–1.5 cm. long, channelled above. *Flowers* pale yellow, in slender long-peduncled grey-pruinose panicles or 7- or 15-flowered dichasia, reaching 15 cm. in length; peduncles very slender, somewhat flattened as are the branches and pedicels; buds obovoid, very minutely puberulous. *Perianth*-tube rather slender, 2 mm. long glabrous within; lobes ovate, 2.5 mm. long, white-villous within specially at the base. *Stamens* slender, 2–2.5 mm. long; those of the 1st and 2nd rows with oblong anthers and anther-cells and nearly glabrous filaments; those of the 3rd row with smaller anthers, filaments villous at base and 2 large uniform glabrous stipitate glands, truncate or lobed at apex, inserted about $\frac{1}{3}$ of the way up the filaments staminodes of 4th row 1.5 mm. long with ovoid acute heads and villous filaments. *Ovary* ovate-oblong, narrowed into the slender style; stigma peltate, oblique. *Fruit* not known.

PERAK: at Waterfall Hill at about 360 m. alt., Wray 2629!; in dense jungle near mountain streams at 300–450 m. alt. near Thaiping, King's Collector 8515!.

14. CINNAMOMUM INUNCTUM, Meissn. in DC. Prodr. XV. 1. 25 (1864). A tree; branchlets slender, black when dry; leaf-buds lanceolate, glabrous. *Leaves* membranous or chartaceous, alternate or sub-opposite; ovate or elliptic, obtuse or bluntly acuminate at apex, rounded or attenuate, usually unequally, at base; both surfaces pale when dry, glabrous; 5–11 cm. long, 3–5 cm. broad; midrib slender, prominent beneath; main nerves faint, 6–9 pairs, the lowest pair frequently opposite and curved to more than halfway up, the rest joining near the margin in small loops, the axils usually bearing a pitted gland; reticulation minutely areolate, prominent under the lens; petiole slender, 1–2.5 cm. long. *Flowers* small, up

to 10 mm. broad when open, in slender few-flowered axillary or lateral glabrous panicles up to 8 cm. long; peduncles slender or filiform; branches sub-opposite, subumbellate; pedicels slender, 5 mm. long. *Perianth*-tube funnel-shaped, short, glabrous within; lobes ovate-oblong, obtuse, up to 2 mm. long, white-villous within, deciduous after flowering. *Stamens* very small; the lower anther cells elliptic, the upper usually circular; those of the 1st and 2nd rows .75—1.25 mm. long, the anthers obtuse, the filaments slender, villous; those of the 3rd row similar and with a pair of reniform subsessile glands close to the base outside the filaments; staminodes of the 4th row cuneiform, stipitate. *Ovary* ovoid; style rather thick, curved; stigma peltate. *Fruit* an ovate berry the size of a pea, seated on a funnel-shaped cupule (Meissn.). Kurz For. Fl. II. 289; Hook. f. Fl. Br. Ind. V. 135. *Camphora inuncta*, Nees in Wall. Pl. As. Rar. III. 32 and Syst. Laur. 89; Miq. Fl. Ind. Bat. I. 1. 905. *Tetranthera camphoracea*, Wall. M.S.

MALACCA (?): Griffith K.D. 4256 !; Maingay K.D. 1244 !.—DISTRICT. Burma (Tavoy).

15. CINNAMOMUM PARTHENOXYLON, Meissn. in DC. Prodr. XV. i. 26 (1864). A very large tree with straight trunk reaching 30 to 45 m. in height and a diameter of 1 m. and perhaps more; branches spreading; branchlets moderately thick, nearly black when dry, the uppermost angular, glabrous; leaf-buds lanceolate, inflorescence buds with large silky-pubescent deciduous scales. *Leaves* very variable in shape and texture, young ones thin, red when first open, the old ones subcoriaceous, alternate; elliptic or elliptic-ovate or -obovate, sometimes lanceolate, acute or acuminate at apex, acute or rounded and usually unequal at base; both surfaces glabrous, the upper dull or slightly shining, the lower more or less glaucous; 6—12 cm. long, 3—6 cm. broad: midrib slender, not prominent; main nerves very irregular, about 6 to 8 pairs, not prominent, curving upwards to join in rather obscure loops near the margin; no glands in the nerve axils; reticulation areolate; petiole slender, 2—3 cm. long, usually channelled above. *Flowers* small, 10 mm. broad when open, light yellow, in lax slender axillary or lateral panicles up to 8 cm. long; peduncles and pedicels filiform, glabrous or the latter puberulous. *Perianth*-tube funnel-shaped, glabrous within; lobes elliptic-oblong, obtuse, nearly glabrous without, villous within, 2—2.5 mm. long, deciduous after flowering. *Stamens* minute, the anthers with nearly circular pores; those of the 1st and 2nd rows

with nearly orbicular anthers and short slightly villous filaments, .75 mm. long; those of the 3rd row 1.25 mm. long, very obtuse, with 2 large reniform subsessile glands attached near the base outside the villous filaments; staminodes of the 4th row cuneiform or sagittate, stipitate, villous outside, 1 mm. long. Ovary ovoid, glabrous; style short; stigma large, peltate. Fruit a globose berry about 7 mm. in diam. seated on the truncate spreading cup-shaped enlarged perianth-tube, the fruiting pedicel long-funnel-shaped; exocarp thick, succulent, dark purple; endocarp crustaceous. Seed spherical; testa membranous; cotyledons hemispherical, enclosing the minute radicle. Kurz For. Fl. II. 289; Hook. f. Fl. Br. Ind. V. 135; Koord. & Val. Bijdr. XI. 82. *C. pseudo-Sassafras*, Meissn. l. c. 27. *C. ? malaccense*, Meissn. l. c. 27. *C. Neesianum*, Meissn. l. c. 26. *Parthenoxylon porrectum*, *pseudo-Sassafras* and *pruinatum*, Blume in Mus. Bot. Lugd.-Bat. I. 323; Miq. Fl. Ind. Bat. I. 1. 967. *Camphora Parthenoxylon*, Nees in Wall. Pl. As. Rar. II. 76; Benth. Fl. Hongk. 290. *C. pseudo-Sassafras*, Miq. in Zoll. Cat. 113, 114. *C. chinensis*, Nees Syst. Laur. 92. *Sassafras Parthenoxylon*, Nees Syst. Laur. 491; Wight Ic. t. 1832 (copied from Roxb.). *Persea pseudo-Sassafras*, Zoll. in Nat. Gen. Arch. II. 635. *Laurus Parthenoxylon*, Jack in Mal. Misc. I. 28; Wall. Cat. 2602. *L. pseudo-Sassafras*, Bl. Bijdr. 573. *L. porrecta*, Roxb. Fl. Ind. II. 308. *Phæbe latifolia*, Champ. in Kew Journ. Bot. V. 197.

PENANG: Wallich 2602!; Curtis 512!, 1038!, 1406!; J. Scott.!; King's Collector 1456!. PROVINCE WELLESLEY: at Tasik Glugor, Ridley 6968!, 12585!. DINDINGS: at Pangkore, Ridley 8377!. PERAK: at Lumut Dindings, Ridley 3044!; at Kinta and Gunong Bubu, King's Collector 7120!, 8354!; at lower camp, Gunong Batu Pateh, Wray 1072!. MALACCA: Maingay K.D. 1244!, 1512!. DISTRIB. Burma, Java, Sumatra, China.

In Herb. Singapore is a sheet collected by F. Dennys at Gunong Menkong Labar in the Federated States. The specimen has no flowers or fruit but the leaves are remarkable for being very thick. Leaves opposite or subopposite, very coriaceous; ovate, obtusely acuminate at apex, rounded at base and slightly decurrent; glabrous and shining on both surfaces; margins flat; ribs 3, flat, with a slender quite basal additional pair close to the margin and soon forming a looped intramarginal nerve; the inner ribs alongside the midrib for about 1 cm. then leaving it to curve upwards to about $\frac{3}{4}$ of the length of the blade when they meet, the first main nerves and break into loops; main nerves from midrib 3—4 pairs, faint, below them prominent not parallel transverse nervules; outside the ribs 6 or more outer nerves, short, meeting the intramarginal one; reticulation prominent, beautifully areolate; length

10–15 cm., breadth 5–8 cm.; petiole very stout 1–1.5 cm. long, bordered above by the decurrent margins of the blade. It seems to belong to *Cinnamomum*; but in the absence of flower and fruit this is not quite certain.

7. ALSEODAPHNE, Nees.

Evergreen trees. *Leaves* alternate, often subverticillate or fasciated at the ends of the branchlets, penninerved. *Flowers* small, hermaphrodite, in axillary or subterminal panicles, the cymules of the branches often subumbellate. *Perianth*-tube short, continuous with the pedicel; lobes 6, subequal, the outer ones often slightly the smaller. *Stamens* 9 fertile, with 4-celled ovate-oblong anthers; those of the 1st row opposite the outer perianth lobes, and introrse; those of the 2nd row opposite the inner perianth-lobes also introrse; those of the 3rd row opposite those of the 1st row, extrorse, and with two usually large glabrous glands at the base a little behind; staminodes of the 4th row opposite the stamens of the 2nd row, large, glabrous on the inner side, stipitate, ovate or cordate. *Ovary* ovoid or globose, 1-celled, 1-ovuled; style rather slender; stigma peltate. *Fruit* an ellipsoid or globose berry, seated on the enlarged perianth-tube and usually persistent lobes and supported by the enlarged often red and warted pedicel (as in *Dehaasia*).—DISTRIB. India, China, Malay Islands and Peninsula, about 12 species.

Third row of stamens with glands distinct from the filaments, at their base.

Leaves membranous

Flowers in glabrous panicles, minute; berry ellipsoid 2.5 cm. long 1. *A. peduncularis*.

Flowers in grey-puberulous panicles, larger; berry globose 1.5 cm. long 2. *A. Wrayi*.

Leaves coriaceous

Drupe globose under 1.5 cm. in diameter; leaves under 12 cm. in length 3. *A. bancana*.

Drupe oblong-ellipsoid, 4–5 cm. long, 2 cm. in diam.; leaves over 20 cm. long 4. *A. petiolaris*.

Leaves very coriaceous, rarely under 15 cm. in length

Berry dull, black, ellipsoid, about 2 cm. long and 1 cm. broad 5. *A. paludosa*.

Berry shining, brown, oblong-ellipsoid, 3.5 cm. long and 2 cm. broad, seated on the prominent enlarged perianth-tube, the lobes deciduous 6. *A. insignis*.

Berry pale brown, very scurfy and pustular, oblong-ellipsoid, 7—8 cm. long and about 4 cm. in diameter; perianth-tube not enlarged in a ring, its lobes persistent

7. *A. Ridleyi*.

3rd row of stamens with glands attached to the filaments above the base: leaves sub-membranous, pendulous, large; panicles subracemose with distant branches and few flowers

8. *A. pendulifolia*.

Species imperfectly known

9. *A. crassipes*.

1. *ALSEODAPHNE PEDUNCULARIS*, Hook. f. in Fl. Br. Ind. V. 144 (1886). A shrub or small tree, reaching 3 to 4·5 m. in height; branchlets white, slender, uppermost nearly black when dry; leaf-buds lanceolate, 5—6 mm. long, black when dry, with few scales. *Leaves* membranous, more or less fascicled at the ends of the branchlets; elliptic-lanceolate, obtusely subcaudate, acuminate at apex, acutely attenuate or cuneate at base; both surfaces glabrous, dark olive-green when dry; 10—20 cm. long, 3—7 cm. broad; midrib slender, raised on both surfaces; main nerves 6 to 10 pairs, slightly curved for about two-thirds of the distance to the margin and then joined by broad loops, prominent and pale beneath; transverse nervules few, irregular, easily visible beneath; petiole slender, 5—10 cm. long. *Flowers* minute, greenish yellow, in slender nearly glabrous pedunculate panicles from the axils of the uppermost leaves, 3—7 cm. long; peduncles subfiliform up to 4 cm. long; branches very slender ending in umbellate cymules of about 3—6 flowers; bracts subulate, bracteoles minute; pedicels subclavate; buds globose. *Perianth*-tube short; lobes nearly equal, ovate, 1—1·5 mm. long, glabrous without, puberulous within. *Stamens* very short, hairy, those of 1st and 2nd rows 75 mm. long with very short villous filaments; those of 3rd row similar but longer and with 2 ovate glabrous villously stipitate 5 mm. long glands at the base or a little behind; staminodes of the 4th row reniform, glabrous except on the back and for a villous tuft at base. *Ovary* globose, slightly villous; style thick, curved; stigma broadly peltate. *Fruit* an ellipsoid berry, 2·5 cm. long, 1·5 cm. in diameter, supported on the persistent perianth lobes and the much thickened cylindric straight or curved red pedicel, 2·4 cm. long; pericarp black when ripe, smooth. *Haasia peduncularis*, Nees Syst. Laur. 376; Meissn. in DC. Prodr. XV. I. 61; Miq. Fl. Ind. Bat. I. i. 930. *Machilus peduncularis*, Nees in Wall. Pl. As. Rar. II. 70. *Persea peduncularis*, Nees Syst. Laur. 125 (excl. syn. Rumph.). *Laurus peduncularis*, Wall. Cat. 2596.

PENANG: *Wallich* 2596!. PERAK: *Wray* 3632!, 3683!, 3792!; *Scortechini* 536!; near Ulu Kerling and Ulu Selangor at 120 to 240 m. alt., *King's Collector* 7916!, 8632!, 8836!. SELANGOR: at Labu and Petaling, *Ridley* 7622!, 8492!; at Kwala Lumpur, *Mohamed* 1908!

2. *ALSEODAPHNE WRAYI*, Gamble in Kew Bull. 220 (1910). A tree, reaching 30 m. in height and a considerable girth; branchlets rather slender with greyish-white bark; leaf-buds lanceolate acuminate nearly 1 cm. long, black, with few scales. *Leaves* membranous, somewhat clustered at the ends of the branchlets; elliptic-lanceolate, obtusely rather long acuminate at apex, narrowed at base; upper surface glabrous, dull, olive-brown when dry, lower minutely puberulous and punctate finally glabrous; 7—12 cm. long, 3—5 cm. broad; midrib slender, slightly impressed and keeled above, raised beneath; main nerves 10—12 pairs raised beneath, rather irregular and usually oblique, curving to branch and meet near the margin in irregular loops; transverse nervules and reticulation clear but not prominent; petiole 1—1.5 cm. long, channelled above. *Flowers* pale green, about 5 mm. in diam. in pedunculate branching slender grey-puberulous panicles from the upper leaf-axils, about as long as the leaves and reaching 10 cm. in length and 5 cm. in breadth; peduncles slender, 4 to 5 cm. long; branch peduncles also slender, cymules 3—5-flowered; pedicels very slender, somewhat clavate, about 7 mm. long; bracts ovate, caducous; bracteoles minute, triangular; buds globose. *Perianth*-tube short, cup-shaped; lobes subequal or the outer very slightly the shorter, up to 2 mm. long, puberulous within as without. *Stamens* of 1st and 2nd rows slender, clavate, 2 mm. long, the filaments and connective villous; stamens of 3rd row as long but more slender and the 2 upper anther-cells very inconspicuous, glands at the base ovoid glabrous rather large; staminodes of 4th row oblong, glabrous except the tuft of hair at the base, about as large as the glands. *Ovary* ovoid, glabrous; style slender; stigma peltate. *Fruit* a globose or slightly ellipsoid berry 1.5 cm. in diam., seated on the persistent reflexed perianth and a clavate subtrigonus enlarged fleshy pedicel 2 cm. long; pericarp black, shining, thin; embryo depressed at apex.

PERAK: at Kota, *Wray* 2543!; in forest near Larut, *King's Collector* 5493!, 5917!

The leaves of this species resemble those of *A. peduncularis*, but the flowers are larger and different in many respects.

3. *ALSEODAPHNE BANCANA*, Miq. Fl. Ind. Bat. I. i. 915 (1855). *Tree* (?); branchlets moderately thick, greyish-brown, lenticellate uppermost more slender; leaf-buds ovate acute, with few shining whitish scales. *Leaves* coriaceous, usually fascicled at the ends of the branchlets; obovate, shortly obtusely acuminate at apex, cuneate at base; both surfaces glabrous, upper dark olive-green to black when dry, lower dull and somewhat reddish puberulous when young; margins slightly recurved; 10–20 cm. long, 5–9 cm. broad; midrib stout, prominent and raised on both surfaces; main nerves 10–12 pairs, the lowest faint, impressed above, raised beneath, at first nearly straight then curving upwards to meet at about 5 mm. from the margin in prominent loops; transverse nervules few, parallel; reticulation obscure; petiole stout, much wrinkled, 10–15 mm. long, bordered by the decurrent margins of the blade. *Flowers* very small, in slender subracemose panicles from the uppermost axils, about as long as the leaves; peduncles slender, 5–8 cm. long; branches short; cymules 3–5-flowered; pedicels slender, 4–5 mm. long; buds globose, 2 mm. in diam. *Perianth*-tube short, lobes subequal, the outer rather shorter than the inner, puberulous, obovate, obtuse. *Stamens* very minute; those of 1st and 2nd rows with nearly orbicular anthers and short broad pubescent filaments, .75 mm. long; those of 3rd row rather longer and narrower, the glands at their base large, white, glabrous; staminodes of 4th row ovate, acute, glabrous without, hairy at back, 5 mm. long. *Ovary* rounded; style short, thick; stigma peltate. *Fruit* a globose berry 1.5 cm. in diameter, seated on the persistent perianth lobes and a not much thickened warty enlarged pedicel; pericarp black, smooth, rather thin. Meissn. in DC. Prodr. XI. i. 28. *A. decipiens*, Hook. f. Fl. Br. Ind. V. 145.

SINGAPORE: Garden jungle and Bukit Timah, *Ridley*, 3369!, 4937!; at Chanchukang, *Ridley* 6156!, 6160!—DISTRIB. Bangka, (*Horsfield*!, *Kurz*!), Borneo (*Haviland* 3086!).

4. *ALSEODAPHNE PETIOLARIS*, Hook. f. in Fl. Br. Ind. V. 145 (1886). A large tree; branchlets subverticillate, very stout, lenticellate, dark brown, scurfy; buds short, conical. *Leaves* coriaceous; oblong or oblong-obovate, abruptly and sharply caudate-acuminate at apex, attenuate to nearly rounded at base: both sur-

faces glabrous, dark brown when dry, reticulate; margins slightly recurved; 20—30 cm. long, 12—18 cm. broad; midrib stout, impressed above, much raised beneath; main nerves 8—12 pairs, at first straight then curved to join in loops near the margin; transverse nervules many, prominent, enclosing the much netted reticulation, all the nerves and nervules raised on both surfaces; petiole very stout, 3—6 cm. long. *Flowers* in stout panicles reaching 20—30 cm. in length from the axils of the upper leaves, the branches rusty-puberulous, ascending; pedicels short, gradually thickening; bracts minute, caducous. *Perianth*-tube funnel-shaped, 1—1.5 mm. long; lobes subequal, 2.5 mm. long, rusty-puberulous without. *Stamens* short, nearly glabrous or only with sparse rusty hairs on the filaments, those of the 1st and 2nd rows obtuse, 1.5 mm. long; those of the 3rd row 2 mm. long with a pair of large glabrous glands at the base behind; staminodes of the 4th row ovate, small, sometimes 0. *Ovary* ovoid; style thick, puberulous; stigma large, capitate. *Fruit* an oblong-ellipsoid drupe 4—5 cm. long, 2 cm. in diam., the pericarp black when dry, supported on the persistent perianth-lobes, the pedicels thickened only to about 3 mm. in diam., rugose and scurfy. *Nothaphæbe ? petiolaris*, Meissn. in DC. Prodr. XV. 1. 59.

PAHANG: at Telom, Ridley 13782!—DISTRIB. India (Assam), Burma.

5. *ALSEODAPHNE PALUDOSA*, Gamble in Kew Bull. 221 (1910). A very large tree reaching 24—30 m. in height and about 1 m. in diameter of stem; branchlets very stout, rough, dark grey; leaf-buds conical, glabrous, about 5 mm. long, with many outer scales. *Leaves* very coriaceous, fascicled at the ends of the branchlets; obovate, obtuse or rather deeply emarginate at apex, long-cuneate at base; upper surface glabrous shining, lower glaucous; margins recurved; 20—25 cm. long, 7—9 cm. broad; midrib very stout, slightly raised above and prominently channelled, nearly flat beneath; main nerves 15 to 17 pairs, rather faint, impressed above, slightly raised beneath, lower ones at about 50° with the midrib, upper at 70°, only curved near the margin or hardly looped; transverse nervules few, irregular, not visible on the upper surface; reticulation minutely areolate, indistinct beneath, invisible above; petiole stout, 3—4 cm. long, bordered by the decurrent margins of the blade. *Flowers* imperfectly known; fruiting inflorescence of racemose panicles from the uppermost axils reaching 10—15 cm. in length; peduncles and rhachis prominently warted; enlarged pedi-

cels obconic, slightly flattened, glaucous and much warted, 2—3 cm. long, surmounted by the prominently persistent perianth-lobes and stamens. *Perianth*-lobes triangular, 5 mm. long and glabrous in fruit, the outer ones slightly the smaller. *Stamens* in fruit very slender, clavate, glabrous; those of 1st and 2nd rows 3 mm. long; those of 3rd row 4 mm. long and with 2 rather large rounded glands; staminodes of 4th row cordate, glabrous, stipitate. *Fruit* (young) an oblong ellipsoid berry about 2 cm. long and 1 cm. in diam., the top depressed; pericarp tough, dull, black when dry.

PERAK: in dense jungle on low wet ground in Larut, *King's Collector* 5378!

This species is very near *A. insignis* and agrees with it very closely in the leaves, but in this the nerves are impressed while in that they are raised; the midrib also differs; while *insignis* seems only to have the apex sometimes slightly emarginate. The fruit of *insignis* has a prominent annular ring and the perianth-lobes which are not very persistent are quite small, while in *paludosa* there is no ring and the lobes are large and prominent.

6. *ALSEODAPHNE INSIGNIS*, Gamble in Kew Bull. 221 (1910). A very large tree reaching 24 to 30 m. in height and about 1 m. in diam. of stem; branchlets very stout, dark brown; leaf-buds conical, about 5 mm. long, with few lanceolate glabrous scales. *Leaves* very coriaceous, fascicled at the ends of the branchlets; oblong or obovate or oblanceolate, rounded or very obtusely acute at apex, cuneate or attenuate, often somewhat decurrent at base; both surfaces glabrous, the upper shining, the lower bluish-green; margins thickened; size variable from 12—15 cm. by 5—7 cm. and somewhat rounded at base, to 15—35 cm. by 5—10 cm. and narrowed at base; midrib very stout, prominent, raised on both surfaces; main nerves 12—15 pairs slightly raised on both surfaces, starting at about 70° with the midrib and curved nearly to the margin where they join in loops; not prominent on the upper, but very evident on the lower surface, joined by rather inconspicuous transverse nervules and a minutely netted reticulation; petiole stout, 3—6 cm. long, channelled above by the continuation of the margins of the blade. *Flowers* light green with yellow stamens, in subterminal, erect, stout, minutely puberulous panicles reaching 15 cm. in length; peduncles and rhachis angular, nearly black; branches short, tawny-puberulous, subumbellate; bracts small, ovate-lanceolate, caducous; pedicels stout, trigonous; buds clavate; fruiting panicles from the uppermost leaf-axils 10—30 cm. long; peduncles in fruit very stout. *Perianth*-lobes puberulous, the outer

3 shorter than the inner 3 which are 2.5—3 mm. long and ovate. *Stamens* rather slender, those of the 1st and 2nd rows 2 mm. long, clavate; those of 3rd row similar but larger, and with 2 rather large glabrous glands at the base; staminodes of 4th row ovate-cordate, glabrous on the inner, villous on the outer face and on the short stalk, 1—1.5 mm. long. *Fruit* shining, glabrous, bright green, chestnut brown when dry, oblong-ellipsoid, obtuse, reaching 3.5 cm. in length and 2 cm. in diam.; seated on the much enlarged perianth-tube which then assumes the form of an annular flattened disk nearly 2 cm. in diam., this again is supported by the clavate, flattened or trigonous, enlarged pedicel 2 cm. long, green mottled with brown spots when fresh, glaucescent and prominently warted when dry.

PERAK: near Larut in dense forest up to 300 m. alt., *King's Collector* 6608!, 6958!, 7273!, 8451!

7. *ALSEODAPHNE* RIDLEYI, Gamble in Kew Bull. 222 (1910). A medium-sized tree; branchlets very stout, light brown, lenticellate; leaf-buds short, with many scales. *Leaves* very coriaceous, clustered at the ends of the branchlets; elliptic-oblong or -obovate, often unequal-sided, obtuse or very minutely apiculate at apex, rounded or attenuate at base; both surfaces glabrous, the upper shining, the lower glaucous; 13—25 cm. long, 5—13 cm. broad; midrib very stout, flattened above or slightly raised, raised beneath; main nerves 12 to 15 pairs, irregular, at from 60° to 70° with the midrib, curving to and along the margin but scarcely looped, very slightly raised above, more so beneath, joined by irregular transverse nervules and an areolate reticulation hardly visible above but more prominent beneath; petiole very stout, enlarged and wrinkled at base, 2—4 cm. long, upper part bordered by the decurrent blade-margins. *Flowers* in glabrous panicles from the upper leaf axils, the panicles reaching 10 cm. long and 5 cm. broad; peduncle rather short, flattened; branches few, 3-chotomous; bracts ovate acute 2—3 cm. long; cymules few-flowered; pedicels clavate, enormously thickened in fruit as is the rhachis; buds globose. *Perianth*-tube short; lobes ovate, the outer slightly smaller. *Stamens* very small, clavate, rounded; glands of 3rd series ovoid; staminodes of 4th series ovate, glabrous. *Fruit* a very large oblong ellipsoid berry with depressed top, 7—8 cm. long and about 4 cm. in diameter, seated on the much thickened pedicel which is often 1—5 cm. thick at top; pericarp 3—5 mm. thick, densely covered as are the enlarged rhachis and pedicel with tawny-brown scurf and raised pustules.

SELANGOR: at 15th mile Pahang track at about 300 m. alt.,
Ridley 8532 !

8. *ALSEODAPHNE PENDULIFOLIA*, Gamble in Kew Bull. 222 (1910). A tree, reaching a height of 12 to 18 m. and a diameter of stem of 20—40 cm.; branchlets very stout, at least 10 mm. in diam. at apex, scarred and wrinkled; leaf-buds ovoid, glabrous, 5 mm. long, with spreading scales. *Leaves* sub-membranous, fasciated at the ends of the branchlets and 'hanging downwards in the shape of an umbrella' (*King's Collector*); obovate or oblanceolate, obtuse or very shortly acuminate at apex, long cuneate at base; both surfaces dull, reddish-brown when dry, the lower paler, glabrous; 17—35 cm. long, 5—11 cm. broad; midrib slender, little raised on either surface; main nerves 15 to 20 pairs, slender, curving upwards to and along the margin, joined by many rather irregular transverse nervules and then again by an irregularly areolate reticulation, prominent under the lens especially beneath; petioles slender, curved, 2—4 cm. long, bordered above by the decurrent margins of the blade. *Flowers* pale yellow, about 5 mm. broad when open; in long, very lax glabrous subracemose panicles from the axils of the fasciated leaves, and nearly as long as the leaves; peduncle rhachis and branches somewhat flattened, black when dry; branches slender, few-flowered, ending in 3-flowered umbels; pedicels slender, clavate at tip, 7 mm. long; buds glabrous, obconic. *Perianth*-tube funnel-shaped, thick; lobes ovate acute, the outer 1 mm. the inner 2 mm. long, sparsely silky within. *Stamens* 1·5—2 mm. long, with the anther-cells unequal, the upper pair very small; those of the 1st and 2nd rows with ovate anthers and broad puberulous filaments; those of the 3rd row with oblong anthers, the upper cells minute, the filaments puberulous, and the 2 reniform glabrous large glands subsessile a little above the broad filament base; staminodes of 4th row cordate, glabrous, broadly stipitate. *Ovary* ovoid, attenuate into the short style; stigma small, obtuse. *Fruit* (very immature) a globose glabrous drupe seated on the enlarged perianth and its enlarged pedicel.

PERAK: in dense forest, chiefly of bamboo, near Ulu Bubong and Ulu Kerling, up to 200 m. alt., *King's Collector* 8785!, 10623!. Without locality, *Burn-Murdoch* in Herb. Singap. Vern. 'Medang Payong' !

Species imperfectly known.

9. *ALSEODAPHNE CRASSIPES*, Hook f. Fl. Br. Ind. V. 146 (1886). A tree?, branchlets stout, woody, with ashy bark, upper-

most and innovations rusty-tomentose. *Leaves* coriaceous, alternate or sub-opposite, falcately recurved; elliptic-lanceolate, acuminate at apex, cuneately narrowed at base; both surfaces glabrous, yellowish when dry, upper shining; 10—13 cm. long, 2·5—4 cm. broad; midrib slender, main nerves 6—8 pairs, raised on both surfaces, at first straight then branching and joining in loops at some distance from the margin; reticulation sparse but prominent; petiole slender, 1·5—2·5 cm. long. *Fruiting peduncles* numerous, 7—10 cm. long, very strict, thickened upwards, as rigid and woody as the branchlets and thicker at the top than the pedicel is broad; pedicels 4—6 mm. long, cylindric, black. *Fruit* smooth, ellipsoid, 15—18 mm. long, 10—12 mm. in diam., dark blue-black, pruinose, with red pedicel.

MALACCA : Maingay K. D. 1261 !

A. ? costalis, Nees in Wall. Pl. As. Rar. II. 72 and Syst. Laur. 185 ; Hook. f. in Fl. Br. Ind. V. 146 seems to be *Litsea robusta*, Bl.

ALSEODAPHNE LUCIDA, Nees in Wall. Pl. As. Rar. II. 72 (1831). “Branches stout, lenticellate. *Leaves* 20—30 cm. long, scattered, very coriaceous, obovate-oblong, acuminate, base obtuse; shining above, paler beneath; nerves 16—20 pairs, spreading, slender; midrib prominent above; reticulations beneath very faint; petiole 2·5—4 cm. long, terete, thickened and rugose at the base.” (Description from Fl. Br. Ind.). Syst. Laur. 186; Meissn. in DC. Prodr. XV. i. 29; Hook. f. Fl. Br. Ind. V. 147. *Laurus ? lucida*. Wall. Cat. 2590.

SINGAPORE : Wallich 2590 !

In the Fl. Br. Ind. it is suggested that this is not a Laurineous plant, but it seems not unlike a *Litsea*. The chief characteristic of the leaves is that the main nerves are at first straight and parallel and curve close to the margin.

8. NOTHAPHŒBE, Blume.

Evergreen trees. *Leaves* alternate, not subverticillate but more or less crowded towards the ends of the branchlets, penni-nerved. *Flowers* very small, hermaphrodite, in axillary or subterminal panicles, the cymules of the branches generally subumbellate. *Perianth*-tube very short, continuous with the pedicel; lobes 6, unequal, the 3 outer usually much smaller than the inner. *Stamens* 9 fertile, with 4-celled ovate-oblong very small villous anthers and short filaments; those of the 1st row opposite the outer perianth-

lobes introrse; those of the 2nd row opposite the inner perianth-lobes, also introrse; those of the 3rd row opposite those of the 1st row, extrorse, with 2 small villous rounded glands at the base a little behind the glands sometimes wanting; staminodes of the 4th row opposite the stamens of the 2nd row, very small, ovate or triangular, villous on both sides. *Ovary* ovoid or globose, style slender, stigma peltate. *Fruit* an ellipsoid or oblong-obovoid berry seated on the enlarged perianth-tube and sometimes persistent lobes and supported by the slightly enlarged pedicel.—**DISTRIB.** Malay Islands and Peninsula, about 13 species.

Leaves mostly obovate or oblanceolate, cuneate at base, under 20 cm. long; glands of 3rd row stamens always present.

Leaves without very prominent raised reticulation; flower panicles under 12 cm. long.

Flower-panicles glabrous or only puberulous.

Leaves chartaceous, main nerves

6—8 pairs 1. *N. umbelliflora*.

Leaves membranous, main nerves

8—10 pairs 2. *N. fruticosa*.

Flower-panicles rusty-tomentose (exc. var.

glabrescens); leaves chartaceo-coriaceous 3. *N. Kingiana*.

Leaves with very prominent raised reticulation;

flower-panicles over 15 cm. long .. 4. *N. reticulata*.

Leaves panduriform-obovate, cordate-auriculate at base,

over 20 cm. long; glands of 3rd row stamens absent

or exceedingly minute 5. *N. panduriformis*.

1. **NOTHAPHŒBE UMBELLIFLORA**, Blume in Mus. Bot. Lugd.-Bat. I. 328 (1850). An evergreen tree reaching 15 to 25 m. in height and a considerable girth; branchlets glabrous, slender, white, the uppermost black when dry, innovations rusty-tomentose; leaf-buds lanceolate, very small, rusty-tomentose, with few or no scales. *Leaves* chartaceous; elliptic, obovate or oblanceolate, cuspidate-acuminate at apex, long-cuneate at base rarely almost rounded but always somewhat decurrent; glabrous on both surfaces, the upper dark olive brown, the lower reddish; 8 to 20 cm. long, 3—6 cm. broad; midrib slender, prominent beneath; main nerves 6—8 pairs, sometimes rather more, rather oblique, curved to the margin where they are joined in loops, cross nervules few, irregular, prominent, raised; reticulation obscure; petiole 8—12 mm. long, often curved. *Flowers* minute, in axillary thyrsiform slender puberulous panicles shorter than the leaves and up to 10 cm. long; branches

many, ultimate cymules umbelliform; bracts ovate, tomentose; bracteoles minute; pedicel clavate, 1—2 mm. long; buds globose, about 1 mm. in diam., sub-glabrous; flowers reddish. *Perianth*-lobes very small, ovate; outer 3.5 to 3.75 mm. long, inner three 1—1.25 mm. long, slightly pubescent within. *Stamens* minute, villous with unicellular hairs, those of 1st and 2nd rows .75 mm. long, rounded at top; those of 3rd row similar but slightly larger, with 2 villous rounded glands a little behind them; staminodes of 4th row minute, ovate, densely villous. *Ovary* globose, 5 mm. in diam.; style as long; stigma small, peltate. *Fruit* an oblong obovoid dark purple berry about 4 cm. long and 2 cm. in diam., seated on the persistent perianth tube and lobes and the very slightly thickened pedicels; pericarp smooth, often spotted, rather thin. Meissn. in DC. Prodr. XV. i. 58; Koord. & Val. Bijdr. X. 105. *N. chartacea*, Bl. l.c. fide Koord. & Val. *Ocotea umbellifera*, Blume Bijdr. 573. *Phæbe*? *umbelliflora*, Nees Syst. Laur. 115; Miq. Fl. Ind. Bat. I. i. 911. *P. chartacea*, Miq. l.c. 912. *Haasia nitida*, Meissn. in DC. l.c. 61. *Alseodaphne umbelliflora*, Hook. f. in Fl. Br. Ind. V. 145.

SIAMESE STATES: Tongka, *Curtis* 2933!. PENANG: Batu Ferengy, Waterfall and other places, *Curtis* 1230!, 1536!, 2784!, 3068!. PERAK: in forest near Larut, Thaiping and Goping, *King's Collector* 3437!, 5897!, 6645!, 7490!, 8484!. MALACCA: *Griffith* K.D. 4253; *Maingay* K.D. 1247!, 1247-2!, 2515!; *Derry* 951!; at Selandan, *Goodenough* 1823!. SINGAPORE: at Chanchukang, &c., *Ridley* 1855!, 2888!, 3934!, 4576!, 6267!.—DISTRIB. Java, Sumatra, Borneo.

Vern. 'Medang Linggudi' (*Derry*); 'Kelah putih' (*Goodenough*).

Curtis 3665! from Waterfall, Penang, with oblanceolate glabrous leaves 20 cm. long and an ellipsoid drupe 3 cm. long, the leaves with about 13 pairs of main nerves, seems to belong to a species of *Nothaphæbe* near to *N. umbelliflora*, Blume.

2. *NOTHAPHÆBE FRUTICOSA*, Gamble in Kew Bull. 223 (1910). A shrub reaching 2—2.5 m. in height; branchlets slender, with greyish-white bark, uppermost black when dry; leaf-buds linear-lanceolate, black, glabrous, 5 mm. long. *Leaves* membranous, towards the ends of the branchlets but not crowded; lanceolate or oblanceolate, acuminate at apex, cuneate at base; both surfaces glabrous except the midrib above, olive-brown when dry; 10—15 cm. long, 3—5 cm. broad; midrib slender, slightly keeled above; main nerves 8—10 pairs, irregular, curving upwards and sometimes

branching, to meet in irregular loops well within the margin, scarcely raised above; transverse nervules few, inconspicuous but visible on the lower surface as are the reticulations; petiole slender, 5 to 15 mm. long. *Flowers* minute, 4 mm in diam., in very slender glabrous pedunculate panicles from the axils of upper leaves reaching 7 cm. in length and about 2 cm. in breadth; peduncles filiform as are the branches and pedicels, the latter clavate nearly 3 mm. long; buds globose. *Perianth*-tube very short; lobes ovate, the outer about 1 mm. long, the inner 1.5 mm., all very glandular and nearly glabrous without, puberulous within. *Stamens* of 1st and 2nd rows very small, clavate, villous, 1.5 mm. long; those of 3rd row rather longer with 2 villous rounded glands at the base; staminodes of 4th row ovate obtuse, villous. *Ovary* oblong; style very thick, curved; stigma large, peltate. *Fruit* not known.

PERAK: at Tapa, Wray 182!; at Ulu Bubong and Larut up to nearly 1000 m. alt., King's Collector 5448!, 11029! SELANGOR: at Ulu Selangor, Goodenough!

An obscure species much resembling in leaf *Alseodaphne peduncularis* and *Wrayi*, but with the flowers of *Nothaphæbe umbelliflora*.

3. *NOTHAPHÆBE KINGIANA*, Gamble in Kew Bull. 224 (1910). A tree, with spreading branches, reaching 12 to 18 m. in height and 40 to 50 cm. in diameter of stem; branchlets moderately stout, greyish-white, lenticellate; leaf-buds lanceolate, tawny pubescent, with few scales. *Leaves* chartaceo-coriaceous, variable in shape; elliptic or elliptic-obovate or -oblanceolate, obtusely acute to even sharply cuspidate acuminate at apex, cuneate attenuate or slightly rounded at base; upper surface shining, olive-green when dry, minutely punctulate, glabrous except on the midrib, lower reddish-brown glabrous; 10—25 cm. long, 5—9 cm. broad; midrib stout, raised on both surfaces; main nerves 8—11 pairs, starting at 50° to 60° with the midrib and curving to and along the margin, the upper ones joining in prominent loops, slightly impressed above, raised beneath, joined by rather irregular distant transverse nervules, which and the minor reticulations are prominent on both surfaces; petiole stout, 1—3 cm. long, the base often wrinkled, the upper part bordered by the decurrent margins of the blade. *Flowers* reddish or yellowish, small, in rusty-tomentose panicles from the upper leaf-axils, the panicles 10—12 cm. long and about 4 cm. broad; peduncle short; rhachis often flattened, branches short, ending in umbels of 3—6 flowers; bracts very small, ovate, caducous; bracteoles minute; pedicels

clavate, about 5 mm. long. *Perianth*-lobes densely rusty-tomentose without, thick, the 3 outer much shorter than the 3 inner, pubescent within. *Stamens* very small, those of the 1st and 2nd rows villous, scarcely 5 mm. long, filaments short, broad, connective obtuse; those of the 3rd row villous, about .75 mm. long, with 2 minute villous glands at the base; staminodes ovate, villous, very small and inconspicuous. *Ovary* oblong, attenuated into a slender style; stigma large, peltate. *Fruit* an obovoid oblong, often curved, berry 5—7 cm. long by 2 cm. broad, seated on the persistent perianth tube and lobes and somewhat enlarged rugose pedicel; pericarp dark red, spotted, smooth, rather thin, the apex wrinkled.

PERAK: at Waterfall, Thaipeng, etc. *Wray* 2268!, 2701!, 3452!; on low ground near Larut and up to about 800 m. alt., *King's Collector* 1928!, 3182!, 4938!, 6647!, 7295!.

Var. *glabrescens*, Gamble. *Panicles* very short, few-flowered, glabrous, the cymules not prominently subumbellate; glands at the base of the 3rd row stamens often absent. *Leaves* obovate or elliptic-oblong, acuminate at apex.

DINDINGS: at Lumut, *Curtis* 3445! (Herb. Singap. and Penang).

4. *NOTHAPHŒBE RETICULATA*, Gamble in Kew Bull. 224 (1910). A small tree reaching 12—15 m. in height and 15—25 cm. in diam.; branchlets moderately stout, pale brown; leaf-buds very small, rounded, pubescent. *Leaves* chartaceous; elliptic-obovate or oblanceolate, obtusely often cuspidately acuminate at apex, cuneate at base; both surfaces glabrous, prominently reticulate and pale olive-brown when dry; 12—22 cm. long, 4—8 cm. broad; midrib slender, slightly raised above, more so beneath; main nerves 8 to 12 pairs, starting at about 60° with the midrib and curving to and along the margin where they are connected, the lower by a series of small loops, the upper by larger ones, joined by a prominently reticulated network of nervules which are raised on both surfaces; petiole rather slender, 1.5—3 cm. long, the upper part bordered by the decurrent margins of the blade. *Flowers* in spreading glabrous axillary or subterminal many-flowered panicles reaching 15—20 cm. in length; rhachis somewhat flattened; branches distant, often decurved, often 6 cm. long; cymules subumbellate; pedicels slender, clavate; flowers secund. *Perianth*-tube short; lobes ovate, acute, the outer 3 rather the smaller, 1.5—2 mm. long. *Stamens* small, those of 1st and 2nd rows clavate, 1.5 mm. long, the anthers elongate, filaments slen-

der and villous ; those of 3rd row similar but slightly longer and with 2 rounded villous glands ; staminodes of 4th row very small, lanceolate, villous as the other stamens with purplish-red hairs. *Ovary* ovoid, attenuated into a slender style ; stigma large, peltate. *Fruit* an ovoid or ellipsoid berry 4 cm. long by 2—3 cm. in diameter, seated on the enlarged rugose pedicel about 1 cm. long, the perianth-tube forming a flattened ring, the lobes apparently deciduous ; pericarp rather thick, dark-brown when dry, with prominent raised corky ferruginous pustules.

PERAK : *Scortechini* ! ; at Gunong Bubu, 1500 m. alt., *Wray* 3872 ! ; at cottage, *Ridley* 2967 ! ; in dense jungle on high mountains at 1000—1200 m. alt., *King's Collector* 7002 !.

5. *NOTHAPHŒBE PANDURIFORMIS*, Gamble. A tree, reaching about 12 m. in height and a considerable girth ; branchlets stout, grey, rough, striate ; leaf-buds short, lanceolate, puberulous. *Leaves* thinly coriaceous, more or less fascicled towards the ends of the branchlets, alternate ; obovate or panduriform, obtuse or bluntly apiculate at apex, cordate-auriculate at base ; glabrous on both surfaces, nearly black when dry on the upper, reddish brown on the lower ; 20—30 cm. long, 7—10 cm. broad, in old trees smaller and with fewer nerves ; midrib broad, stout, usually flat on the upper surface, raised on the lower ; main nerves 12 to 20 pairs, more numerous near the base, at first nearly straight, then curved to close to the margin where they meet in loops, joined by prominent parallel transverse nervules and the reticulation ; petiole very stout, 5—6 mm. long, sometimes 0. *Flowers* very small, yellow, in branching axillary rusty-pubescent panicles 10—20 cm. long and scaly at the base ; branches slender ; terminal cymules subumbellate, densely rusty-tomentose ; bracts and bracteoles triangular, acute, very small ; pedicels thick, about 2 mm. long ; buds globose. *Perianth*-tube very short ; outer 3 lobes triangular, 5 mm. long ; inner 3 ovate, half as long again. *Stamens* minute ; those of 1st and 2nd rows clavate, 5 mm. long, apex glabrous, filaments coppery-villous ; those of 3rd row longer, obtuse at tip, basal glands none or extremely minute ; staminodes of 4th row triangular, glabrous in front, villous behind. *Ovary* ovate ; style short, curved ; stigma peltate. *Fruit* an obovoid or cylindric-oblong curved berry 5—7 cm. long and 2—2.5 cm. in diam., seated on the remains of the perianth and a slightly enlarged pedicel, the apex wrinkled and depressed ; pericarp coriaceous, rather thin, smooth, dull red, when dry dark brown ; seed cylindric,

cotyledons conform to fruit, the apex depressed. *Alseodaphne panduriformis*, Hook. f. in Fl. Br. Ind. V. 145.

PERAK : *Scortechini* 1130!; at Chaukat Sardang and Simpang, Wray 742!, 2039!; at Ulu Bubong up 180 m. alt., King's Collector 7815!, 10019!, 10433!, 10655!. SELANGOR : at Labu river, Ridley 7624!. MALACCA : Maingay K.D. 1263!; at Panchor, Goodenough 1258!; at Brisu, Derry 950!. PAHANG : at Ayer Etam, Ridley 2413!; at Chenei river, Fox 5010!.

Vern. 'Poko Rengas' (Wray); 'Medang Kladi' (Goodenough).

9. MACHILUS, Nees.

Evergreen trees; buds of the inflorescence with imbricate scales; leaf-buds lanceolate. *Leaves* alternate, penni-nerved, minutely reticulate. *Flowers* small or moderate-sized, hermaphrodite, in slender panicles, usually from the axils of upper leaves and appearing fascicled. *Perianth*-tube short or obsolete; lobes 6, subequal, or the outer slightly the smaller, persistent and reflexed or spreading in fruit. *Stamens* 9 perfect, with 4-celled anthers; those of the 1st row opposite the outer perianth-lobes, introrse, with long filaments and ovate or elliptic anther-cells; those of the 2nd row similar, introrse, opposite the inner perianth-lobes; those of the 3rd row opposite the 1st row stamens, extrorse, with oblong narrow anthers, slender filaments and a pair of stipitate glands at the base; staminodes of the 4th row cordate, stipitate, opposite the 2nd row stamens. *Ovary* sessile, narrowed into the style; stigma small or discoid. *Fruit* a globose or oblong berry, seated on the reflexed perianth which is hardly enlarged; fruiting pedicel not enlarged. —DISTRIB. About 25 species, all Asiatic, chiefly in north and north-east India and Burma, extending to China and Japan.

MACHILUS SCORTECHINII, Gamble in Kew Bull. 226 (1910). A tree, reaching 12 to 15 m. in height and 40 to 50 cm. in diameter of stem; branchlets dark brown, moderately stout, uppermost minutely tawny-puberulous as are the small lanceolate leaf-buds; scars of the inflorescence bud-scales prominent. *Leaves* chartaceous; obovate or obovate-oblong, shortly acute at apex, cuneate or attenuate at base; both surfaces dull, glabrous, olive-brown when dry; 10—20 cm. long, 4—7 cm. wide; midrib rather slender, channelled above, raised beneath; main nerves 8—10 pairs, slightly impressed above, raised beneath, at about 70° with the midrib,

curving to the margin, the upper ones joined in loops; transverse nervules irregular; reticulation prominently areolate under the lens; petiole slender, glabrous, 1—2 cm. long, channelled above. *Flowers* small, yellow, 6 mm. in diameter when open, in pedunculate grey-tawny pubescent axillary panicles reaching 10—20 cm. long; peduncles about one-third of the length of the panicle; branches spreading, dichotomous, subcorymbose, ending in 3-flowered dichasia; pedicels slender, 2—3 mm. long; buds globose. *Perianth-tube* very short; lobes subequal, ovate acute, densely tawny-tomentose without, sericeous within, 2—3 mm. long. *Stamens* slender; filaments silky-pubescent; those of 1st and 2nd rows 2 mm. long with ovate obtuse anthers; those of 3rd row as long, with oblong anthers and glabrous reniform stipitate glands; staminodes of 4th row cordate, villous-stipitate, 1 mm. long. *Ovary* oblong; style slender; stigma obtuse, small. *Fruit* not known.

PERAK : *Scortechini* 492 !; an high mountains near Thaiping at 1000 to 1500 m. alt., *King's Collector* 8413 !.

The fruit being unknown it is impossible to say for certain whether this species belong to *Phæbe* or *Machilus*; but it has more the habit of *Machilus* than of *Phæbe*.

10. PHÆBE, Nees.

Evergreen trees or shrubs. *Leaves* alternate, often fascicled at the ends of the branchlets, penni-nerved (in Asiatic species); leaf-buds lanceolate or ovate, with few and usually spreading scales, sometimes with none. *Flowers* hermaphrodite or rarely polygamous, in pedunculate panicles from the upper leaf-axils as if fascicled, the branches dichasioid. *Perianth-tube* short; lobes 6 subequal, the outer 3 somewhat shorter than the inner, spreading at flowering, afterwards closing, erect and enlarged. Perfect *stamens* 9, with 4-celled ovate-oblong anthers; those of the 1st row opposite the outer perianth lobes, with elliptic introrse anthers, and slender filaments; those of the 2nd row similar and also introrse, opposite the inner perianth-lobes; those of the 3rd row opposite those of the 1st row but extrorse, often rather longer and more slender, bearing at or a little above their bases two large stipitate glabrous glands; staminodes of the 4th row opposite the 2nd row stamens, cordate or sagittate, stipitate, glabrous within. *Ovary* sessile, usually globose; style slender; stigma obtuse. *Fruit* an ovoid, ellipsoid or globose berry, seated on a cup formed of the enlarged erect persistent

perianth-lobes; cotyledons fleshy, the embryo conform to the fruit.—
DISTRIB. Species about 20, in India and Malaya, with a further
 14 American.

Leaves lanceolate, glabrous or nearly so.

Leaves long-acuminate, main nerves 10—15 pairs;
 perianth glabrous; berry ovoid; filaments villous 1. *P. lanceolata*.

Leaves obtusely acuminate, main nerves 7—10
 pairs; perianth glabrous or slightly puberulous,
 berry globose; filaments glabrous .. 2. *P. declinata*.

Leaves obovate, hairy

Flowers rather large, 1 cm. broad when open.

Leaves chartaceous, cuneate at base; ferruginous-
 pubescent beneath; perianth densely ferruginous-
 tomentose 3. *P. macrophylla*.

Leaves coriaceous, rarely cuneate at base, glau-
 cescent and minutely puberulous beneath only;
 perianth greyish tomentose 4. *P. Kunstleri*.

Flowers small, under 6 mm. broad when open.

Leaves coriaceous, shortly cuneate or attenuate
 at base; perianth densely tawny-pubescent;
 panicles up to 25 cm. long 5. *P. opaca*.

Leaves thinly coriaceous, long cuneate at base;
 perianth grey-tomentose; panicles up to 10
 cm. long only 6. *P. cuneata*.

1. *PHŒBE LANCEOLATA*, Nees Syst. Laur. 109 (1836). A small
 evergreen tree; branchlets slender, with yellowish-white bark,
 young ones black when dry, villous, with persistent linear tawny-
 pubescent leafy scales; leaf-buds lanceolate with similar scales.
Leaves chartaceo-coriaceous, usually clustered at the ends of the
 branchlets; lanceolate, long acuminate at apex, long cuneate at
 base; olive-brown and shining on the upper surface, pale brown
 on the lower, glabrous; 12—23 cm. long, 2—4 cm. broad; midrib
 slender, raised on both surfaces; main nerves 10 to 15 pairs, curving
 upwards to and along the margin, the upper ones joining in loops;
 transverse nervules and reticulation irregularly netted, prominent
 on the lower surface; petiole slender, 1—3 cm. long. *Flowers* in
 slender axillary glabrous subcorymbose panicles; peduncles slender,
 in flower about 5 cm. long, much longer in fruit; branches few,
 spreading, ending in dichasia; bracts linear, 5 mm. long, grey-
 puberulous; pedicels slender, clavate; buds obovoid, glabrous;
 flower pale yellow. *Perianth*-tube short; lobes ovate, subequal,
 3 mm. long, villous within. *Stamens* of 1st and 2nd rows 1.5 mm.
 long, anthers oblong, obtuse, filaments and connective villous;

those of 3rd row rather large and with narrower anthers, furnished near the base behind with 2 reniform glabrous glands on short villous stalks or nearly sessile; staminodes of 4th row 1.25 mm. long, cordate, glabrous, villous-stipitate. *Ovary* globose; style slender; stigma peltate. *Fruit* an ovoid berry 12–13 mm. long, 7–8 mm. in diam., seated on the enlarged glabrous unequal erect perianth-lobes; pericarp smooth, black. Meissn. in DC. Prodr. XV. i. 34 (excl. var. γ .); Wight Ic. t. 1821; Brandis For. Fl. 377 and Ind. Trees, p. 532; Kurz For. Fl. II. 290; Hook. f. Fl. Br. Ind. V. 141; Prain Beng. Plants 900; Koord. & Val. Bijdr. X. 94; Ridley in Trans. Linn. Soc. 2nd Ser. III. 340 *Ocotea lanceolata*, Nees in Wall. Pl. As. Rar. II. 71. *Laurus lanceolata*, Wall. Cat. 2599. *L. lanceolaria*, Roxb. Fl. Ind. II. 309.

PAHANG: banks of Tahan river, Ridley 2272.—DISTRIB. India (subtropical Himalaya from the Sutlej eastwards), Burma, Java (Middle and East Java).

The description is taken entirely from Ridley's specimens which agree well in flower and fruit with the Indian ones, but have longer and narrower leaves with more numerous main nerves and more conspicuous reticulation.

2. *PHŒBE DECLINATA*, Nees Syst. Laur. 114 (1836). A tree; branchlets slender, grey, upper ones black when dry; leaf-buds small, lanceolate, slightly silky, without scales. *Leaves* chartaceo-coriaceous; lanceolate or elliptic-lanceolate, obtusely acuminate at apex, cuneate or attenuate at base; upper surface glabrous, shining, black-brown, lower reddish-brown or subglaucous, glabrous or very minutely puberulous; 7–12 cm. long, 2–4.5 cm. broad; midrib slender, impressed above; main nerves 7–10 pairs, very slender, obscure, curving upwards to and along the margin and joined by the minutely areolate reticulation; petiole slender, black, 1–2 cm. long, channelled above. *Flowers* in slender axillary black panicles, 8–12 cm. long; peduncles long, slender, terete; branches few, subcorymbose, ending in dichasia; pedicels slender, 2–5 mm. long, clavate; buds globose; flowers glabrous or slightly puberulous. *Perianth*-tube short; lobes ovate acute, subequal, the 3 outer slightly shorter, 2–3 mm. long, ciliate on the margins, silky within at the base. *Stamens* slender, 1 mm. long, glabrous except a tuft of silky hairs at the base; those of the 1st and 2nd rows with oblong anthers; those of the 3rd row with narrower anthers and two large stipitate glands at the base a little behind; staminodes of 4th row cordate-sagittate, silkily stipitate, 1 mm. long. *Ovary*

globose; style short; stigma capitate. *Fruit* a globose berry 7—10 mm. in diameter, seated on the short persistent scarcely enlarged perianth lobes and slightly enlarged pedicels; pericarp thin, black. Meissn. in DC. Prodr. XI. i. 34; Miq. Fl. Ind. Bat. I. i. 906; Hook. f. Fl. Br. Ind. V. 142; Koord. & Val. Bijdr. X. 95. *P. lanceolata*, var. γ . *ligustrina*, Meissn. l.c. *P. parviflora*, Bl. Mus. Bot. Lugd.-Bat. I. 327; Miq. l.c.; Meissn. l.c. *P. sumatrana*, Meissn. l.c. (*non* Miq. *fide* Koord. & Val.) *P. lamponga*, Miq. Fl. Ind. Bat. Suppl. 359. *Ocotea declinata*, Bl. Bijdr. 572. *O. ligustrina*, in part, Nees in Wall. Pl. As. Rar. II. 71 and III. 32. *Laurus declinata*, Bl. Cat. Hort. Buit. 66. *L. ligustrina*, Wall. Cat. 2588A. *Machilus* sp., Hook. f. Fl. Br. Ind. V. 862.

PENANG: at Penara Bukit, *Curtis* 942!, 1030!; at Balik Pulau, *Ridley* 9420!; Government Hill, *Fox* 47!. PERAK: in open jungle on hills at 250 to 400 m. alt., *King's Collector* 8748!. SELANGOR: at Ulu Selangor, *Goodenough* 10530!. SINGAPORE: *Wallich* 2588A; at Changi, *Ridley* 1811!, 4707!.—DISTRIB. Java (*Forbes* 594!), Sumatra.

Some of *Curtis'* specimens in Herb. Singap. have fruits with erect perianth-lobes and with reflexed perianth-lobes on the same shoot; apparently they are normally erect. The perianth-lobes are properly glabrous as described in the Fl. Br. Ind. but sometimes puberulous without as admitted by Koorders and Valetton. The following variety is only distinguishable by still greater silky pubescence.

var. *sericea*, Gamble. *Perianth*-lobes markedly silky villous without.

PERAK: on Haram Peak, *Scortechini* 554!

3. *PHOEBE MACROPHYLLA*, Blume in Mus. Bot. Lugd.-Bat. I. 326 (1851). An evergreen tree reaching 15 to 20 m. in height and 40 to 50 cm. in diameter of stem; branchlets stout, tuberculate, the upper parts with ferruginous tomentum, as are the thick conical leaf-buds with lanceolate scales. *Leaves* chartaceous; obovate or more rarely elliptic, shortly obtusely (occasionally acutely) apiculate at apex, cuneate or attenuate at base; upper surface shining, glabrous except on the midrib and main nerves, generally bullate, lower ferruginous-pubescent; margin recurved; 12—30 cm. long, 7—15 cm. broad; midrib very stout, impressed above as are the main nerves and transverse nervules, prominent beneath; main nerves 10 to 15 pairs, the lower ones very small and close together, curved outwards to and along the margin and joined, the lower by a series of small,

the upper by wide loops; transverse nervules many, prominent; reticulation irregularly areolate; petiole stout, very tomentose, 1.5—3 cm. long. *Flowers* rather large, greenish yellow, 1 cm. broad when open, closed after flowering, in long-peduncled densely ferruginous-tomentose panicles from the upper leaf-axils, reaching 25 cm. or longer and about 8 cm. in breadth; peduncles two-thirds of the length, tomentose even in fruit; branches spreading, corymbose, dichotomous, ending in 3-flowered dichasia; bracts and bracteoles lanceolate, caducous; pedicels short, clavate; buds globose. *Perianth*-tube short; lobes elliptic acute, the outer three slightly shorter than the inner which are 6—7 mm. long. *Stamens* large, the filaments and stalks of the glands and staminodes villous; those of 1st and 2nd rows 3 mm. long with elliptic emarginate anthers, those of 3rd row similar, but longer and oblong and narrow and with large stipitate glabrous reniform glands 1.5 mm. long; staminodes of 4th row cordate, acuminate, glabrous, with stalk 3 mm. long. *Ovary* globose, glabrous; style slender; stigma small, peltate when young. *Fruit* an ovoid-oblong berry 20 mm. long, 10 mm. in diameter, truncate at apex, seated on the enlarged puberulous perianth-lobes, nearly 10 mm. long; pericarp brown, shining, rather thin. *Miq. Fl. Ind. Bat.* I. i. 908; *Meissn. in DC. Prodr.* XI. i. 38; *Koord. & Val. Bijdr.* X. 88. *P. elliptica*, Blume l.c. *Persea macrophylla*, Blume *Bijdr.* 568 *in part.* *Machilus? macrophylla*, Nees *Syst. Laur.* 674 *in part.*

PERAK: at Waterloo, *Curtis* 2727!; *Scortechini* 1779!; hill forests about Larut up to 450 m. alt., *King's Collector* 3918!, 5607!, 5663!. SINGAPORE: at Bukit Mandai, *Ridley* 4581!, garden jungle, *Ridley* 3579!, 3891!, 13317!.

4. *PHOEBE KUNSTLERI*, Gamble in *Kew Bull.* 226 (1910). A large tree reaching 25 to 30 m. in height and 60 to 90 cm. in diameter of stem; branchlets stout, rugose, with prominent scars and oblong corky lenticels, uppermost tawny-puberulous; leaf-buds short, ovoid, tawny-pubescent. *Leaves* coriaceous; obovate or elliptic-obovate, obtuse or obtusely short apiculate at apex, attenuately narrowed at base for the lower half; upper surface shining, glabrous, lower glaucescent, minutely puberulous; margins slightly recurved; 12—24 cm. long, 6—11 cm. broad; midrib rather stout, impressed on the upper, raised on the lower surface; main nerves 8 to 12 pairs, impressed above, prominently raised beneath, curved to the margin where they meet in loops, joined by rather prominent distant trans-

verse nervules and an irregularly netted reticulation; petiole 1·5 to 4 cm. long, somewhat flattened above, puberulous. *Flowers* pale yellow, 10 mm. in diameter, in stout long-peduncled grey-tawny puberulous panicles from the axils of upper leaves, reaching about 20 cm. in length; peduncles 10—12 cm. long; branches 5 cm. long or less, dichotomous, subcorymbose, ending in pairs of flowers or 3-flowered dichasia; bracts caducous, triangular; pedicels slender, 5—6 mm. long; buds oblong, 5—7 mm. long. *Perianth*-tube short; lobes ovate acute, the outer 4 mm. long, the inner 5 mm., tomentose on both sides. *Stamens* slender, those of 1st and 2nd rows with elliptic anthers and long villous slender filaments 3 mm. long; those of the 3rd row 3·5 mm. long, the anthers oblong, truncate at apex, the two glands large, reniform, glabrous, attached a little above the base; staminodes of 4th series cordate, glabrous, villous behind and as the rather slender stipes, 2 mm. long. *Ovary* globose, minutely hirsute; style slender; stigma obtuse, slightly spreading. *Fruit* an ovoid berry 15 mm. long, 10 mm. in diam., truncate at apex, seated on the slightly spreading persistent glabrous perianth-lobes; pericarp bluish-green when fresh, nearly black and wrinkled when dry.

PERAK: in forests on hills near Goping up to 240 m. alt., *Kunstler* (*King's Collector*) 4491!, 6180!, 8173!; *Scortechini* 497!; at Blanda Mabok, *Wray* 3964!. SUNGEI UJONG: Herb. Singap. 2325 (Vern. 'Poko Medang Kusirai')!. SINGAPORE: at Pulau Ubri, *Ridley* 5915!.—DISTRIB. Borneo (*Haviland*!).

5. *PHOEBE OPACA*, Blume in Mus. Bot. Lugd.-Bat. I. 327 (1851). A tree reaching 20—25 m. in height and 40—50 cm. in diameter of stem; branches stout with whitish bark; branchlets thick, lenticellate, uppermost minutely puberulous; leaf-buds conical, 6—7 mm. long, densely tawny-puberulous, with leafy scales. *Leaves* coriaceous; obovate or oblanceolate or elliptic-obovate, shortly and obtusely acuminate at apex, cuneate or attenuate at base usually for some length; upper surface glabrous, shining, lower dull glaucescent, minutely puberulous, finally glabrous; 10—27 cm. long, 5—8 cm. broad; midrib stout, impressed above, raised beneath; main nerves 8 to 15 pairs, prominent beneath and often dark, variable in obliqueness, but all curving to and along the margin, joined by rather obscure parallel transverse nervules and an inconspicuous reticulation; petiole black, terete, 15—25 mm. long. *Flowers* 4—6 mm. broad when open, in spreading rusty-pubescent panicles from the axils of the uppermost leaves, appearing fascicled, reaching

25 cm. or more in length and 10 to 12 in breadth; peduncles about 12 cm. long; branches 2—3 cm. long, dichotomous, usually ending in 3-flowered dichasia; bracts lanceolate, leafy, early caducous; bracteoles similar but smaller; pedicels clavate; buds globose. *Perianth*-tube short; lobes elliptic, acute, 3—4 mm. long, the outer slightly shorter than the inner, densely tawny-pubescent. *Stamens* of 1st and 2nd rows with elliptic obtuse anthers 1.5 to 2 mm. long, and villous filaments; those of 3rd row oblong rather longer and with two large glabrous reniform stipitate glands near the base, back of connective, filaments and stalks of the glands villous; staminodes of 4th row cordate, apiculate, glabrous, on long villous stalks, 1 mm. in all. *Ovary* globose, glabrous or very slightly puberulous; style slender; stigma small. *Fruit* an ovoid berry, 15 mm. long, 10 mm. in diameter, depressed at apex, seated on the closely appressed persistent perianth-lobes, 5 mm. long and glabrous as is the fruiting rhachis of the panicle; pericarp smooth, shining, reticulate when dry. Miq. Fl. Ind. Bat. I. i. 909; Meissn. in DC. Prodr. XI. i. 36; Hook. f. Fl. Br. Ind. V. 143; Koord. & Val. Bijdr. X. 91. *P. attenuata*, Miq. in Pl. Jungh. 125. *P. densiflora*, Bl. l.c.; Miq. l.c.; Meissn. l.c. *P. javanica*, Meissn. l.c. 37. *P. malaccensis*, Meissn. l.c. 37. *P. lucida*, Bl. l.c.; Miq. l.c.; Meissn. l.c. *fide* Hook. f. *Alseodaphne? grandis*, Nees in Wall. Pl. As. Rar. II. 72 and Syst. Laur. 183; Meissn. l.c. 28. *Laurus grandis*, Wall. Cat. 2594A. *Persea grandis*, Nees in Wall. Pl. As. Rar. III. 32.

PENANG: Wallich 2594 A!. PERAK: hill forests near Perak, up to 450 m. alt., *King's Collector* 5980!, 8339!. MALACCA: Griffith K.D. 4255!; Maingay K.D. 1245!, 1246!; at Merliman, Goodenough 1620!; Holmberg 708!; Derry 922!; at Sadanun reserve, Derry 513!. JOHORE: at Kwala Sembrong, *Lake and Kelsall* 4013!?. SINGAPORE: at Pulau Ubu, *Ridley* 5915!—DISTRIB. Java, Sumatra, Borneo.

Var. *cuspidata*, Gamble. *Leaves* cuspidate-acuminate at apex, rather thin; *perianth*-lobes shorter, less pubescent.

PERAK: near Ulu Kerling at 150—250 m. alt., *King's Collector* 8538!.

6. PHÆBE CUNEATA, Blume in Mus. Bot. Lugd.-Bat. I. 908 (1851). A tree reaching 20 to 25 m. in height and 60—90 cm. in diameter of stem; branchlets stout, pale-brown, with prominent scars and lenticels, uppermost tawny-pubescent. *Leaves* thinly coriaceous, more or less fascicled at the ends of the branchlets;

obovate or obovate-oblong, shortly acute or acuminate at apex, long-cuneate at base; upper surface shining, glabrous except at the midrib, lower tawny-puberulous especially at the nerves; margins slightly recurved; 10—25 cm. long, 4—8 cm. broad; midrib prominent, impressed above, raised beneath; main nerves 8—12 pairs, slightly impressed above, curving obliquely upwards to the margin, the upper ones joining in loops; transverse nervules prominent, subparallel; reticulation prominent under the lens; petiole 10—25 mm. long, densely tawny-tomentose. *Flowers* about 3—6 mm. broad when open, in long-peduncled greyish-tawny panicles from the uppermost leaf-axils, reaching 10 cm. in length in flower, much longer in fruit; branches few, spreading, ending in subcorymbose dichasia; pedicels 2—4 mm. long, clavate; buds globose; flowers yellowish. *Perianth*-tube short; lobes subequal, the outer 3 rather the shorter, ovate acute, about 3 mm. long, densely grey-tomentose. *Stamens* of 1st and 2nd rows 1.5—2 mm. long, the anthers elliptic obtuse or emarginate, glabrous in fruit, the filaments villous; those of 3rd row rather longer and similar but the anthers narrower, oblong, the 2 basal glands large glabrous reniform villous-stipitate; staminodes of 3rd row cordate, 1.25 mm. long, villous-stipitate, *Ovary* rounded, glabrous; style slender; stigma small. *Fruit* an ovoid or ellipsoid berry reaching 20 mm. long and 12 mm. in diameter, truncate at apex, seated on the enlarged, puberulous, appressed or somewhat spreading perianth-lobes; pericarp bluish-green when fresh, pale and shining when dry, finally black. Miq. Fl. Ind. Bat. I. i. 908; Meissn. in DC. Prodr. XI. i. 36; Koord. & Val. Bijdr. X. 90. *P. multiflora*, Bl. l.c.; Miq. l.c.; Meissn. l.c. (fide Koord. & Val.). *Persea macrophylla* var. *cuneata*, Bl. Bijdr. 568. *Machilus macrophyllus* var. Nees Syst. Laur. 674.

PROVINCE WELLESLEY: at Kubong Ulu Reserve, *Curtis* 2425!. PERAK: Maxwell's Hill, *Ridley*!; in dense jungle near Larut up to 1300 m. alt., *King's Collector* 801!, 2646!, 6249!, 6577!, 6616!, 6995!, 10893!; at lower camp, Gunong Batu Pateh, over 1000 m. alt., *Wray* 1186!. SINGAPORE: at Changi, *Ridley* 4812!—DISTRIB. Java.

11. STEMMATODAPHNE, Gamble.

Trees. *Leaves* alternate, membranous, crowded towards the ends of the branchlets; the nerves conspicuous. *Flowers* in umbels in lax panicles from the upper leaf-axils; pedicels very long and

conspicuous. *Perianth*-lobes 6, subequal, with a raised ring at their base inside. *Stamens* 9 fertile with 4-celled anthers; those of the first and second rows short triangular with no or very short broad filaments, introrse; those of the 3rd row similar but with extrorse or marginal anther-cells, and with two minute glands at the base, sometimes absent; staminodes of the 4th row triangular, sessile; the staminal ring detachable. *Ovary* usually globose; style short; stigma minute. *Fruit* a large globose berry; fruiting perianth persistent, the lobes erect or somewhat reflexed; the pedicel enlarged, clavate.—**DISTRIB.** One species.

STEMMATODAPHNE PERAKENSIS, Gamble in Kew Bull. 227 (1910). A tree with spreading branches reaching 10 to 12 m. in height and 30 to 45 cm. in diam. of stem; branchlets moderately stout, with greyish white bark; leaf-buds lanceolate, tawny-pubescent. *Leaves* membranous; obovate, long acuminate at apex, cuneate, attenuate or sometimes a little rounded at base; both surfaces glabrous, the upper nearly black when dry, often bullate, the lower dark brown; 12–30 cm. long, 6–12 cm. broad; midrib stout, flat or slightly impressed above, much raised beneath; main nerves 10 to 15 pairs, unequally distant, slightly impressed above, raised beneath, straight or slightly curved to near the margin, where the lower ones end in a series of small loops and the upper ones are joined by prominent large loops forming a continuous intramarginal nerve to the apex; transverse nervules parallel, slender, more or less impressed above, smaller reticulation not prominent; petiole variable in length, 1–5 cm. long, channelled above, glabrous. *Flowers* small, in lax slightly puberulous panicles from the upper leaf-axils, reaching 10–12 cm. in length and black when dry; peduncles slender, 3–7 cm. long; branches few, 1–1.5 cm. long, ending in 4–5-flowered umbels; pedicels conspicuous, red, clavate, minutely puberulous, 10–15 mm. long; buds globose. *Perianth*-lobes subequal, rounded, 1–2 mm. long, with a pubescent ring at their base within behind the stamens. *Stamens* triangular, with no or very short thick villous filaments, all .5–.7 mm. long, those of 3rd row with very minute or no basal glands; staminodes of 4th row triangular acute, .6 mm. long, villous at base. *Ovary* ovoid-globose; style very short, conical; stigma minute. *Fruit* a large obovoid globose berry reaching 6 cm. in length and 4–5 cm. in diameter, seated on the persistent more or less reflexed perianth-lobes and the enlarged clavate warted pedicel 2–3 cm. long and 5–7 mm. broad at top; pericarp smooth.

PERAK: at Thaipeng, Wray 2658!; at Kwala Dipong, *Scortechini* 1793!; Ulu Bubong and Larut Hills up to 300 m. alt., *King's Collector* 3153!, 6703!, 10541!. MALACCA: at Batang Malacca, *Derry* 203!, 1157!. Vern. 'Medang Taying' (*Derry*), 'Meddang Katanah' (*Herb. Singap.* 920!), 'Medang Kuning' (*Herb. Singap.* 865!).

Tribe VI. LITSEÆ.

12. ACTINODAPHNE, Nees.

Evergreen trees or shrubs. *Leaves* subverticillate, rarely scattered or opposite, penni-nerved, sometimes 3-ribbed at base, leaf-buds with imbricate perulate scales. *Flowers* small, diœcious, in axillary or lateral dense bracteate sessile or peduncled clusters or short racemes bearing bracteate umbellules of usually 5; the bracts imbricate, caducous; the pedicels lengthening after the fall of the bracts. *Perianth*-tube short; lobes 6, sub-equal. *Stamens* in ♂ flowers 9; those of the 1st row 3, opposite the outer perianth-lobes; those of the 2nd row 3, opposite the inner, both without glands; those of the 3rd row opposite those of the 1st the filaments 2-glandular; anthers all oblong, introrse, 4-celled; filaments slender. *Staminodes* in ♀ flowers also 9, those of the 1st and 2nd rows spatulate or linear, eglandular, those of the 3rd row linear and biglandular. *Ovary* in ♀ flowers ovoid, attenuate into the style; stigma dilated; in ♂ flowers rudimentary and empty or obsolete. *Fruit* a berry resting on the enlarged hardened flat or concave perianth-tube, the perianth-lobes usually persistent. *Seed* with thin testa; cotyledons very thick, usually hemispheric.—*DISTRIB.* About 50 species, in India, the Malay Peninsula and Archipelago and eastwards to Japan.

I regret to say that I am not very well satisfied with the work done on this most difficult genus, and especially with the following analysis. Except in the first three species the material available has been meagre and characters difficult to obtain.

Leaves at least 10—20 cm. long by 4—12 cm. broad;
drupe globose.

Leaves oblanceolate, coriaceous, fruiting perianth
discoid.

<i>Leaves</i> in whorls of up to 12 or more, lower surface glabrous or nearly so; drupe 20—25 mm. in diam. 	1. <i>A. sesquipetalis</i> .
<i>Leaves</i> in whorls of 6 to 10, lower surface rusty-tomentose; drupe 10—13 mm. in diam.	2. <i>A. Maingayi</i> .

- Leaves obovate, chartaceous, lower surface puberulous, glaucous; drupe 10—12 mm. in diam.; fruiting perianth disciform 3. *A. glomerata*.
- Leaves lanceolate, chartaceous, lower surface glabrous, glaucous; fruiting perianth cup shaped .. 4. *A. montana*.
- Leaves not reaching 10—20 cm. long by 4—12 cm. broad; drupe globose or ovoid; fruiting perianth usually cup-shaped.
- Leaves usually over 10 cm. in length, more or less lanceolate.
- Leaves coriaceous, glabrous, glaucous beneath; fruiting perianth flattened 5. *A. johorensis*.
- Leaves subcoriaceous, usually puberulous beneath, not glaucous; fruiting perianth cup-shaped 6. *A. malaccensis*.
- Leaves chartaceo-coriaceous, tawny-villous beneath; fruiting perianth cup-shaped, rugose 7. *A. Ridleyi*.
- Leaves usually under 10 cm. in length, at most under 12 cm. coriaceous.
- Leaves lanceolate or oblanceolate, acuminate at apex.
- Leaves glaucous or glaucescent beneath, puberulous only when young .. 8. *A. pruinosa*.
- Leaves greyish-tawny-pubescent at all times 9. *A. Hullettii*.
- Leaves elliptic oblong, obtuse at apex, glaucous beneath 10. *A. oleifolia*.
- Leaves elliptic-ovate or obovate, white-glaucous beneath.
- Leaves cuspidate-acuminate at apex .. 11. *A. cuspidata*.
- Leaves bluntly acute at apex.. .. 12. *A. fragilis*.

1. *ACTINODAPHNE SESQUIPEDALIS*, Hook. f. and Th. in Herb. Ind. Or.; Hook. f. in Fl. Br. Ind. V. 151 (1886). A large tree reaching 15 to 20 or more metres in height and 50 to 75 cm. in diameter of stem; branchlets very stout, light-tawny-pubescent, the uppermost silkily villous; verticil-nodes marked by the very prominent scars of fallen leaves and leaf-bud scales; terminal branch-buds very large with imbricate tawny-pubescent scales, the outer ones leaf-like reaching 5 cm. or more in length and 4 cm. in diam. *Leaves* coriaceous, in prominent whorls of 12 or more; oblanceolate, shortly acuminate at apex, cuneate at base; upper surface shining, smooth, lower subglaucous, silky-villous especially on the nerves, at length glabrous; 20—50 cm. long, 4—12 cm. broad; midrib stout, channelled above, strongly raised beneath and often very silky-villous; main nerves 15 to 20 pairs, at about 30° with the midrib, only slightly curved near the margin, raised on both surfaces; transverse nervules and reticulation inconspicuous; petiole very stout, tawny-villous, 1—2 cm. long. *Flowers* in dense clusters 1 to 3 cm. in diameter on

the branchlets between the upper verticils and supported by orbicular concave deciduous bracts; clusters bearing a number of shortly peduncled involucre each of 4 orbicular concave deciduous bracts and enclosing an umbellule of 5 flowers, the centre one longer peduncled (5 mm.) than the 4 outer (2 mm.); ♂ and ♀ flowers similar with short perianth-tubes and 6 subequal concave perianth-lobes, pubescent without, glabrous within, 5-nerved and prominently gland-dotted at length recurved. *Stamens* of ♂ flowers in 3 rows, those of the 2 outer rows eglandular, those of the inner row with a pair of long sessile glabrous glands; anthers oblong 1.5—2 mm. long, glabrous; filaments as long as anthers with a thick tuft of golden-tawny unicellular hairs. *Staminodes* of ♀ flowers oblong or lanceolate, glabrous, the inner row biglandular. *Ovary* short, villous, that of ♂ flowers rudimentary or 0, that of ♀ flowers ovoid; style thick, curved; stigma peltate, large, crenately 3—4-lobed. *Fruit* globose, orange when ripe, smooth, shining, 20—25 mm. in diam. seated on the enlarged thickened rugose perianth which is cup-shaped when young, at length disciform, 10—15 mm. in diam.; pericarp thick, fleshy, shining. *Litsæa macrophylla*, Kurz For. Fl. II. 305 not of Blume. *Myristica sesquipedalis*, Wall. Cat. 6809.

PENANG: *Wallich* 6809!; at Waterfall and Pulau Boetong, *Curtis* 2304!, 2473!. PERAK: at Maxwell's Hill, 4000 ft., *Curtis* 2053!; *Scortechini* 209!; at Relan Tujur, *Wray* 4225!; Goping, Larut, etc., up to 1000 ft., *King's Collector* 4399!, 5008!, 5147!, 6435!, 7202!.—DISTRIB. Tenasserim, at Mergui, *Griffith* 4327!

2. *ACTINODAPHNE MAINGAYI*, Hook. f. in Fl. Br. Ind. V. 151 (1886). A large tree reaching 15 to 20 m. or more in height and a considerable diameter of stem; branchlets very stout, dark tawny-pubescent, the uppermost and innovations densely villous with brown hairs, verticil-nodes marked by the prominent scars of fallen leaves and leaf-bud scales; terminal branch-buds oblong with imbricate scales, the outer ones leaf-like reaching 1 to 2 cm. in length and densely tawny-pubescent. *Leaves* coriaceous, in whorls of about 6 to 10; oblanceolate or elliptic-oblong or oblong-obovate, shortly acuminate at apex, cuneate or attenuate at base; upper surface shining, glabrous except the nerves, lower rusty-tomentose especially on the nerves, younger ones subglaucous between them; 15 to 40 cm. long, 5—12 cm. broad; midrib stout, slightly raised, flattened and tomentose above, much raised beneath; main nerves 10 to 20 pairs at about 40° to 50° with the midrib, curved upwards to the

margin, impressed above and pubescent, strongly raised, beneath; transverse nervules very prominent, subparallel, much raised beneath, slightly depressed above, joined by a prominent reticulation; petiole very stout, rusty-tomentose, 2 to 4 cm. long. *Flowers* in dense clusters about 2 cm. in diam. on the internodes between the upper verticils and supported by orbicular concave bracts glabrous within; clusters bearing many stoutly-peduncled involucre each of 4 orbicular concave bracts enclosing an umbellule of 5 flowers, the centre one longer peduncled than the 4 outer; ♂ and ♀ flowers similar with 6 subequal ovate concave perianth-lobes, tomentose without, glabrous within, 5—7 nerved, prominently gland-dotted, at length recurved, 4—5 mm. long. *Stamens* of ♂ flowers in 3 rows, the inner row with a pair of large rugose glabrous glands a little above the base of the filaments; anthers elliptic-oblong, 2 mm. long, glabrous; filaments rather longer with a tuft of tawny-brown hairs at their bases. *Stamens* of ♀ flowers reduced to lanceolate glabrous staminodes. *Ovary*, style and stigma of ♀ flowers not seen, in ♂ flowers 0. *Fruit* globose, bright yellow when ripe, smooth, 10—13 mm. in diam., seated on the flat, enlarged, 6-lobed perianth 10 mm. in diameter and villous beneath, the lobes reflexed; pericarp thick, fleshy; pedicels little enlarged, 3 mm. long, villous.

PERAK: at lower camp, Gunong Batu Pateh, at 1000 m. alt. *Wray* 915!, at Tapah *Wray* 1333!; at Gopong on low ground up to 150 m., *King's Collector* 6172!. MALACCA: *Maingay* K.D. 1258!, 1275!. SINGAPORE: at Pulau Ubin, *Ridley* 9489!, at Bukit Timah *Ridley*!

Kunstler says: "this is a very fine-looking tree" and indeed it must be.

Var. *macrocarpa*, Gamble. *Leaves* only slightly pubescent beneath and more glaucous; *fruit* depressed-globose 2—2.5 cm. in diameter.

PERAK: at lower camp, Gunong Batu Pateh, 1000 m. alt. *Wray* 1230! (a bush); in dense jungle on high mountains, Larut, 900—1200 m., *King's Collector* 6435! (a small tree 20 to 25 ft. high). PAHANG: at Telan, *Ridley* 13783!—DISTRIB. Borneo, at Matang, *Ridley* 11675!?

Var. *elliptica*, Gamble. *Leaves* elliptic, acuminate at apex, rounded attenuate at base, glaucous and pubescent beneath, 20—25 cm. long, 10—12 cm. broad; young fruit in pedunculate cymes about 3 cm. long.

PERAK: at lower camp, Gunong Batu Pateh, *Wray* 1226!.

3. *ACTINODAPHNE GLOMERATA*, Nees Syst. Laur. 597 (1836). A spreading tree reaching 10 to 12 m. in height and 30 to 45 cm. in diam. of stem; branchlets fairly stout, striate, shortly rusty-puberulous, ultimately glabrescent; verticil-nodes scarred; innovations densely silky pubescent; terminal branch-buds with the outer scales leaf-like 2—3 cm. long and the inner ones persistent at intervals on the internodes very silky and about 15 mm. long. *Leaves* chartaceous, in whorls of 4 to 7; obovate, abruptly acuminate at apex, acute or cuneate at base; upper surface glabrous except on the nerves, scarcely shining, lower pale grey to glaucous, minutely velvety puberulous, rusty-pubescent on the nerves; 10—30 cm. long, 6—12 cm. broad; midrib moderately stout, rusty pubescent, slightly raised on the upper, more so on the lower surface; main nerves 8 to 12 pairs at about 50° with the midrib, at first straight, then curved to and along the margin, raised on both surfaces; transverse nervules many, subparallel, prominent beneath, other reticulations scarcely visible; petiole pubescent, 2—2.5 cm. long. *Flowers* yellowish, in clusters of rather long-pedunculate rusty-pubescent cymes on the branchlets between the upper verticils or axillary at those verticils supported by orbicular concave deciduous bracts; cyme-peduncles slender, up to 2 cm. long, bearing umbellules of 5 flowers or less, supported by an involucre of 4 boat-shaped ovate bracts up to 1 cm. long; pedicels slender, those of the central flower longest at first, afterwards all subequal, 5 mm. long; perianth-tube very small or none; lobes ovate, glabrous within, 3—4 mm. long, 3—5-nerved. *Stamens* of ♂ flowers in 3 rows, those of the 1st and 2nd rows eglandular, 4 mm. long, with oblong obtuse anthers and slender filaments bearing a tuft of tawny hairs at the base; those of the 3rd row as long but with more rounded anthers, and the filaments bearing tufts of tawny hairs and halfway from the base two large glabrous ovoid glands; pistil of ♀ flowers none. *Staminodes* of ♀ flowers, ovary, style and stigma not seen. *Fruit* depressed-globose, up to 12 mm. in breadth and 10 mm. high, shortly apiculate, in compound umbels with thickened peduncles, seated on the flattened disciform enlarged perianth not lobed at the margins and about 6 mm. in diam.; pericarp thick, smooth, apparently yellow; cotyledons hemispheric. Blume in Mus. Bot. Lugd.-Bat. I. 343; Miq. Fl. Ind. Bat. I. i. 968; Meissn. in DC. Prodr. XV. i. 215; Koord. & Val. Bijdr. X. 114. *Litsæa glomerata*, Bl. Bijdr. 566; Nees in Wall. Pl. As. Rar. II. 65. *Laurus glomerata*, Bl. Cat. Hort. Buit. 66.

PERAK: in open jungle on marshy ground under 100 m. alt., *King's Collector* 4192!. SINGAPORE: at Bukit Tima, Bukit Mandai and Bukit Panyang, *Ridley* 6296!, 6741!, 12529!.—DISTRIB. Java (*Forbes* 526 !), Sumatra.

4. *ACTINODAPHNE MONTANA*, Gamble in Kew Bull. 312 (1910). A tree reaching 15 to 20 m. in height and 30—45 cm. in diam. of stem; branchlets dark brown, glabrous, striate; shoot-buds cylindro-conical, 1 cm. or more long, perulate, the scales ovate, rusty-villous, with recurved tips. *Leaves* chartaceous, in whorls of 4—5, the nodes thickened; lanceolate or oblanceolate, long acuminate at apex, acuminate at base; both surfaces glabrous, the upper brown when dry, paler near the nerves, the lower bluish-green beneath, grey-glaucous when dry; 15—25 cm. long, 4—8 cm. broad; midrib prominent, raised on both surfaces; main nerves 8—10 pairs, very oblique, at about 30° with the midrib, gently curving to join in serial loops near the margin; transverse nervules prominent, usually arched, enclosing the netted reticulation; petiole rather slender, 1—3 cm. long, channelled. *Flowers* in umbellules in pubescent racemes about 2 cm. long from the internodes between the whorls, the flowers themselves not known. Young *fruit* (mature not known) enclosed in the cup-shaped enlarged perianth-tube, puberulous without, villous within, the cup as long as the rather slender enlarged pedicels.

PERAK: in open forest on mountain tops near Larut at 900—1100 m. alt., *King's Collector* 2129!, 2913!.

This species comes very near to *A. angustifolia*, Nees, but differs in having the nerves of the leaves not raised and in a much longer cup to the fruiting perianth-tube. When the flowers and ripe fruit are obtained it may be possible to say if it is not a variety only.

5. *ACTINODAPHNE JOHORENSIS*, Gamble in Kew Bull. 313 (1910). A tree?, branchlets terete, greyish-brown, glabrous, uppermost slightly rufous-villous; buds small, villous. *Leaves* coriaceous, in whorls of 3—5; narrowly lanceolate, obtuse at apex, long-cuneate at base; glabrous on both surfaces, the upper shining, olive-green when dry, the lower glaucous-grey; 12—16 cm. long, 3—5 cm. broad; midrib slender, raised on both surfaces; main nerves distant, 6—7 pairs, oblique, raised on the upper surface, joining in loops near the margin; secondary nerves few; transverse nervules very faint on the upper surface; reticulation minutely areolate, almost invisible; petiole 2—3 cm. long, channelled. *Flowers* in apparently sessile

umbellules on the internodes between the leaf-whorls, otherwise not known. *Fruit* a globose drupe 12 mm. in diam., seated on the flattened lobed enlarged perianth-tube 7 mm. in diam.; fruiting pedicel thick, 8 mm. long; pericarp dull black when dry.

JOHORE: at Gunong Panti, 300 m. alt., *Ridley* 4419!—DISTRIB. Lingya.

6. *ACTINODAPHNE MALACCENSIS*, Hook. f. in Fl. Br. Ind. V. 148 (1886). A tree; branchlets rather stout, densely rusty-tomentose; terminal branch-buds lanceolate, the outer scales leaf-like, up to 1 cm. long. *Leaves* subcoriaceous, in whorls of 4 to 7; elliptic-oblong or -lanceolate, obtusely acuminate at apex, attenuate at base; upper surface shining, glabrous, lower puberulous when young, glabrous when old except sometimes on the nerves; 10—20 cm. long, 4—7 cm. broad; midrib rather slender, raised on the upper surface; main nerves 8—12 pairs, often rather irregular and branched, impressed above, conspicuous beneath; transverse nervules few, irregular; reticulation obscure; petiole rusty-tomentose, 1—2 cm. long. *Flowers* in globose clusters 7—13 mm. in diam. at the verticils or on the internodes between them, supported by small orbicular deciduous bracts; clusters with many sessile involucre each of 4 orbicular concave bracts 2—3 mm. long, pubescent without glabrous within and 1—3-nerved; each involucre bearing an umbellule of 3 flowers, the middle one longer pedicellate than the side ones; ♂ and ♀ flowers similar, with 6 ovate ciliate perianth-lobes 2 mm. long, puberulous without, glabrous within. *Stamens* of ♂ flowers in 3 rows, 1.5 mm. long, the anthers ovate, the filaments hidden in tufts of tawny-silky hairs, those of the inner row with 2 large nearly basal reniform glabrous glands; rudimentary ovary conical. *Staminodes* of ♀ flowers also in 3 rows, those of the 2 outer rows clavate, those of the third row hastate with two large glabrous glands on the filaments; filaments always with tufts of silky hair. Ovary sub-globose; style short, slender; stigma broadly peltate. *Fruit* 'globose, 8 mm. in diameter, seated on the very small cup-shaped thickened perianth-tube 3 mm. in diam.; pedicel very short and thick' (Hooker).

MALACCA: *Maingay* K.D. 1259!; *Hullett* 647!. SINGAPORE: in garden jungle, *Ridley* 9123!

7. *ACTINODAPHNE RIDLEYI*, Gamble in Kew Bull. 312 (1910). A tree?; branchlets terete, cylindric, uppermost rusty-pubescent; buds

small. *Leaves* chartaceo-coriaceous, in whorls of 4 to 6; lanceolate, acuminate and mucronate at apex, acuminate at base; upper surface shining, glabrous, areolate, lower tawny-villous, pubescent on the midrib and nerves; margins somewhat recurved; 10—16 cm. long, 3—5 cm. broad; midrib slender, raised on both surfaces; main nerves 6—8 pairs, curving upwards to join in small loops near the margin; transverse nervules straight, obscure as is the reticulation, which under the lens seems punctate on the upper surface; petiole moderately stout, rusty-pubescent, 1—2 cm. long. *Flowers* in sessile axillary or lateral umbellules supported by chaffy deciduous scales; involucre bracts orbicular, deciduous; flowers about 4 in each umbellule; perianth-tube 2.5 mm. long; perianth-lobes obovate, obtuse, 3.5 mm. long, densely villous without, glabrous within. *Stamens* of ♂ flowers unknown. *Staminodes* of ♀ flowers 9, those of the outer two rows linear-clavate 1.5 mm. long, the filaments villous, those of the 3rd row similar but with a pair of large subreniform glabrous glands a little above the base. *Ovary* obovoid, hirsute on top; style slender, curved; stigma small, 3-lobed. *Fruit* a globose drupe nearly 1 cm. in diam., seated on the enlarged rugose cup-shaped perianth-tube which is surmounted by the persistent lobes and staminodes; pericarp shining, glabrous.

JOHORE: at Gunong Pulau, *Ridley* 12165!—DISTRIB. Borneo (*Haviland*).

8. *ACTINODAPHNE PRUINOSA*, Nees in Wall. Pl. As. Rar. II. 68 (1831), III. 31 (1832) and Syst. Laur. 591. A tree; branchlets slender, pale brown, uppermost rusty-tomentose; terminal buds lanceolate 1—1.5 cm. long, with many acuminate glabrous chaffy imbricate scales. *Leaves* coriaceous, in whorls of 4 to 6; lanceolate elliptic-lanceolate or oblanceolate, acuminate often caudately at apex, cuneate at base; upper surface shining, smooth, lower glaucous or glaucescent, finely puberulous when young; 7—12 cm. long, 3—5 cm. broad; midrib red, slender, raised on both surfaces; main nerves 8 to 10 pairs, slender, rather irregular, curved to and along the margin, slightly impressed on the upper surface, raised beneath; reticulation obscure; petiole slender, 7—13 mm. long. *Flowers* sessile or peduncled in fascicles on the internodes between the verticils or at the verticils themselves, supported by orbicular basal bracts; ♂ in globose heads up to 1 cm. in diam., when in bud in shortly-peduncled umbellules supported by 4 concave early caducous hispid bracts, the outer ones keeled and 4 mm. long; umbel-

lules of 3 (or 5, two being rudimentary) flowers, the central one pedicelled, the side ones sessile at first but afterwards pedicelled, each flower with 6 orbicular ciliate perianth-lobes glabrous within afterwards reflexed; ♀ in tawny-pubescent cymes 1 cm. long, the cymes branching and bearing similar bracteate umbellules of 3—5 flowers, flowers with a shortly campanulate perianth-tube, tawny-villous within, and 6 ovate reflexed perianth lobes 1.5 to 2 mm. long. *Stamens* of ♂ flowers in 3 rows, those of 2 outer rows oblong-ovate with slender villous filaments, those of 3rd row similar but with two large glabrous glands on the filaments; staminodes of ♀ flowers small, those of two outer rows slender oblong with villous filaments, those of 3rd row hastate with a pair of large glands at the base. *Ovary* ovoid; style curved, slender; stigma peltate; ovary of ♂ flowers similar but very small. *Fruit* a globose drupe, 5—7 mm. in diam., seated on the cupular, turbinate, enlarged perianth-tube about 6 mm. in diam., lobes deciduous leaving a waving margin; pericarp smooth; enlarged pedicel clavate, up to 7 mm. long, Meissn. in DC. Prodr. XV. 1. 216; Hook. f. in Fl. Br. Ind. V. 152; Miq. Fl. Ind. Bat. I. i. 967. *Laurus pruinosa*, Wall. Cat. 2584 A. B.

PENANG: *Wallich* 2584 B!; at Moniot's road, 1200 ft. (both ♂ and ♀) *Curtis* 1020!. SINGAPORE: *Maingay*, K.D. 1253!; at Changi, *Ridley* 2768! (leaves rather larger and less glaucous than type and fruiting pedicels longer).

Var. *Kunstleri*, Gamble. Upper branchlets less pubescent. Leaves less acuminate at apex, more so at base. *Drupe* globose, up to 1 cm. in diam., seated on a smaller more thickened turbinate cupule 6 mm. in diam. at mouth; pedicels shorter, less clavate.

PERAK: dense jungle on low ground near Larut at 90—150 m. alt., *King's Collector* 6063!.

9. *ACTINODAPHNE HULLETHI*, Gamble in Kew Bull. 314 (1910). A tree; branchlets rather slender, dark greyish-brown, uppermost closely tawny-pubescent. Leaves coriaceous, in whorls of 3 to 5; oblanceolate, acuminate at apex, cuneate at base; upper surface shining, glabrous except on the midrib, lower softly and closely greyish-tawny-pubescent; 7—11 cm. long, 2—3 cm. broad; midrib slender, raised on both surfaces, tawny-pubescent, branching into 5—6 pairs of very oblique (20°—30°) main nerves which often again branch; transverse nervules few, only apparent in very old leaves; reticulation not visible: petiole 5—10 mm. long, tawny-pubescent. *Flowers*

in bracteate axillary or lateral clusters, the bracts deciduous leaving a thick very short peduncle; ♂ flowers on pedicels 2—3 mm. long; perianth-tube short, villous; perianth-lobes ovate, ciliate, pubescent without, glabrous within, 2.5 mm. long. *Stamens* 9, those of the 1st and 2nd rows shortly oblong on short villous filaments, those of the 3rd row rather shorter and with each a pair of large reniform glands; rudimentary ovary ovoid, with short style; staminodes of ♀ flowers not known, nor fruit.

SINGAPORE: in Botanic Garden (wild ?) *Hullett* 659!—also sheet in Herb. Kew with number 38=2 'from botanic garden'!

10. *ACTINODAPHNE OLEIFOLIA*, Gamble in Kew Bull. 313 (1910), A shrub or small tree, scarcely 2—3 m. high; branchlets slender. terete, pale greyish-brown, uppermost densely and softly ferruginous-villous as are the leaf-buds and inflorescence. *Leaves* coriaceous, in whorls of 4—8; elliptic-oblong or -lanceolate, very obtusely attenuate at apex, shortly attenuate at base; upper surface shining or rather dull, prominently areolately pitted, lower surface paler or glaucous, both surfaces glabrous; 5—11 cm. long, 2—3 cm. broad; midrib stout, prominent, reddish; main nerves 8—10 or more, prominent and raised above, at about 70° with the midrib, curved upwards to anastomose near the margin; secondary nerves many; transverse nervules arched, reticulation areolately netted; petiole red, slender, 1—2 cm. long, slightly twisted. *Flowers* in dense tawny-villous cymose clusters of umbellules in the axils of the verticils or on the internodes between them, supported by orbicular concave deciduous bracts; umbellules usually of 5 flowers, the centre one the longest, surrounded by 5—6 concave imbricate involucre bracts; in ♂ flowers umbels 1 to about 3, in ♀ flowers apparently only 1; perianth-lobes ovate, densely villous without, glabrous within, 2—3-nerved, the inner 3 slightly the smaller and narrower, 2—3 mm. long. *Stamens* of ♂ flowers in 3 rows, the inner row with 2 large reniform sessile glands, filaments villous with golden-tawny hairs; staminodes of ♀ flowers also in 3 rows, the outer 2 rows spatulate, the inner hastate with 2 large glabrous glands. *Ovary* in ♂ flower without ovules; style slender; stigma capitate, lobed. *Fruit* ovoid-oblong, 7—12 mm. long, 4—7 mm. broad, the base supported by the cup-shaped enlarged perianth-tube which is surmounted by the persistent perianth-lobes and 5—7 mm. broad at top; pedicels thickened, 5 mm. long, tawny-villous; pericarp smooth, surmounted by the persistent style.

PERAK: at Gunong Batu Pateh, 1400 m. alt., *Wray* 280!, at Gunong Inas, 1500 m., *Wray* 4111!; in open jungle on top of Gunong Batu 1500—1600 m., *King's Collector* 7347!; at 1500 m., *Scortechini* 350!. PAHANG: at Gunong Berimbu, *Ridley* 13728!; at Kluang Terbang *W. D. Barnes*!—DISTRIB. Borneo (near Kuching, Sarawak, *Haviland* and *Hose* 334!)

This species greatly resembles *A. stenophylla*, Thwaites, a Ceylon species; but differs in the shorter peduncles and the fruit, and especially in the fruiting perianth-tube which has persistent lobes and is more cup-shaped, while in *A. stenophylla* the lobes are deciduous and the tube shallow. *A. stenophylla* also has the midrib of the leaves tawny-villous, while the under-surface in *A. oleifolia* is quite glabrous. The Borneo specimens have rather larger leaves reaching 4—5 cm. in breadth and much less prominently areolate, but otherwise agree.

11. *ACTINODAPHNE CUSPIDATA*, Gamble in Kew Bull. 314 (1910). A tree reaching 12 to 18 m. in height and 20—30 cm. in diam. of stem; branchlets rather thick with greyish or yellowish bark, uppermost rusty-pubescent; shoot-buds perulate, the scales ovate or lanceolate, acuminate. *Leaves* coriaceous, in whorls of about 4; elliptic or elliptic-obovate, long cuspidate-acuminate at apex with a very sharp acumen, attenuate at base; upper surface glabrous, shining, lower glaucous-white with scattered black hairs, the midrib and nerves rusty pubescent; 8—12 cm. long, 4—5 cm. broad; midrib prominent, raised on both surfaces; main nerves 8—10 pairs, irregular, curving upwards to join in loops near the margin; transverse nervules nearly horizontal, enclosing the rather minute reticulation; petiole slender, rusty-pubescent, 1 cm. long. *Flowers* in umbellules in very short rusty-pubescent racemes under 1 cm. long, subterminal or lateral from the internodes between the whorls, supported at the base by chestnut-brown hard ovate acuminate caducous scales; peduncles very short; involucrel bracts 4, broadly ovate, enclosing the umbellule of 4 flowers; perianth lobes ovate, obtuse, ciliate, gland-dotted, 2—5 mm. long. *Stamens* of ♂ flowers 9, those of the 1st and 2nd rows 2 mm. long, with oblong anthers and slender villous filaments, those of the 3rd row shorter with a pair of large glabrous, sessile or very shortly stipitate, glands at the base, rudimentary ovary very small; style slender; stigma capitate. *Fruit* and ♀ flowers not known.

PERAK: in dense jungle on hills at 150—250 m. alt. near Ulu Bera, *King's Collector* 10797!

11. *ACTINODAPHNE FRAGILIS*, Gamble in Kew Bull. 315 (1910).

A tree reaching 12—18 m. in height and up to 60 cm. in diam. of stem; branchlets rather slender, dark greyish-brown, with longitudinal cracks, glabrous, the ultimate ones minutely puberulous. *Leaves* coriaceous, in whorls of 2—4; ovate or elliptic-ovate, bluntly-acute at apex, acute at base; glabrous on both surfaces, the upper pale brown when dry, the lower white-glaucous; 5—12 cm. long, 2—5 cm. broad; midrib slender, raised on both surfaces; main nerves 5—6 pairs, the lowest pair subopposite, curving to the margin and then joining in loops; transverse nervules and areolate reticulation obscure; petiole slender, 1—2 cm. long, channelled. *Flowers* in umbellules in slender rusty-puberulous pedunculate umbels up to 1 cm. long, lateral on the internodes between the leaves of the uppermost branchlets, the joints easily breaking, glabrous in fruit; involucre bracts very early deciduous; pedicels slender, 2 mm. long; perianth-tube short, with a ring of golden-villous hairs at the mouth within; lobes ovate, ciliate, glabrous within, 1 mm. long. *Stamens* of ♂ flowers not known. *Staminodes* of ♀ flowers very small, clavate, the filaments villous at base, those of the 3rd row with a pair of orbicular glabrous glands. *Ovary* globose; style slender; stigma large, capitate. *Fruit* an ovoid drupe nearly 1 cm. long, 7—8 mm. in diam., seated on the patelliform enlarged perianth-tube 5—6 mm. in diam., its margin entire; pericarp smooth, shining; enlarged pedicel 7 mm. long.

PERAK: in open jungle on tops of hills, Ulu Bubong, 180—280 m. alt., *King's Collector* 10743!, 10904!

13. *LITSEA*, Lamk.

Evergreen or rarely deciduous trees or shrubs; leaf-buds usually without scales. *Leaves* alternate or sometimes opposite or sub-opposite, penni-nerved. *Flowers* diceious, in sessile or more usually pedunculate umbellules of several flowers, varying from 2 to 15 but usually 4 to 6, supported by 4 to 6 or rarely more involucre bracts, the outer ones at any rate orbicular concave; umbellules in axillary or lateral (i.e. above leaf-scales or on branches or on the trunk) racemes varying from under 1 cm. long to about 20 cm., the raceme bracts very caducous; flower-pedicels short, sometimes 0; perianth-tube in ♂ flowers 0 or very small, in ♀ flowers funnel-shaped, lobes normally 6 often more sometimes wanting in whole or part, equal or

unequal. *Stamens* in ♂ flowers normally 9 or 12, sometimes more, rarely less (in one species 6), in four rows, those of the two outer rows with eglandular or occasionally 1—2-glandular filaments, those of the 3rd row with biglandular filaments, as are those of the 4th row when present, all the stamens with 4 cells, two cells introrse or the lower pair lateral; ovary 0 or rudimentary with rudimentary style and stigma, very rarely 1-ovuled. *Staminodes* in ♀ flowers normally 9 or 12, etc., as in ♂, those of the outer 2 rows usually clavate or spatulate, those of the inner rows usually shorter subulate or clavate with a pair of glands at their bases; ovary enclosed in the perianth-tube or free, globose or ovoid; style usually thick, often curved; stigma dilated, irregularly lobed. *Fruit* globose, ovoid, ellipsoid or cylindric, resting on the more or less enlarged perianth-tube and supported by the more or less enlarged pedicel; the enlarged perianth-tube sometimes very small and merely supporting the fruit, sometimes obconic or cupular partly enclosing it, sometimes even much enlarged and almost wholly enclosing it; perianth-lobes usually deciduous, occasionally persistent; pericarp usually succulent. *Seed* 1; testa thin; cotyledons conform to the seed, fleshy.—*DISTRIB.* Tropical and subtropical Asia, in India, Burma, the Malayan Peninsula and Archipelago eastwards to Japan, south to the Pacific Islands, Australia and New Zealand; scarce in Africa and America: species from 150 to 200.

In preparing the following key, I have reluctantly been obliged to abandon the idea of arranging the species under the old subgenera having found the task almost impossible. However, in avoiding characters taken from the flowers and relying chiefly upon those of the leaves, inflorescence and fruit, I think I may have made it more easy to follow in the field, where a worker can only very rarely have at his command specimens of both ♂ and ♀ plants as well as of the fruit. It may not be out of place to sound a note of warning as to the fruit; the enlarged perianth forming the cupule varies greatly as it develops gradually to maturity; and mature specimens are quite necessary for proper identification. The flowers in this genus are very variable but in a single umbellule there are usually one or two flowers with the normal number of parts, the rest frequently varying considerably from them, the central flower often having more than the normal number.

I need say little on the reasons for the adoption of *Litsea*, Lamk., as the generic name; for the subject was fully gone into first by Jussieu in the *Annales d'Hist. Nat.* VI. 197 who fixed on *Litsea*, and by Blume in *Mus. Bot. Lugd.-Bat.* I. 371 who decided to adopt *Tetranthera*, Jacq., and afterwards by Bentham and Hooker in the *Gen. Pl.* III. 162 who showed that *Litsea*, Lamk., was the correct name. They have been followed in this by Pax in Engler and Prantl *Naturl. Pflanzenfam.* III. 2, 199.

Leaves alternate. (Nos. 1-48.)

Leaves hairy on the lower surface. (Nos. 1-12.)

Perianth-lobes incomplete or 0; tomentum grey

Umbellules in pedunculate umbels or corymbs up to 5 cm. long; leaves usually obtuse .. 1. *L. chinensis*.

Umbellules in almost sessile clusters; leaves short-acuminate .. 2. *L. tomentosa*.

Perianth-lobes complete; tomentum usually more or less reddish. (Nos. 3-12.)

Umbellules on woody tubercles from the trunk of the tree

Leaves under 30 cm. long, 10 cm. broad, purplish-red beneath .. 3. *L. johorensis*.

Leaves over 30 cm. long, 10 cm. broad, rusty-tomentose beneath .. 4. *L. trunciflora*.

Umbellules in clusters or racemes on the branchlets. (Nos. 5-12.)

Leaves coriaceous, obovate, usually very large, nerves and nervules very strong; branchlets very stout

Umbellules peduncled, in short thick racemes scarcely 1 cm. long; leaves rusty beneath .. 5. *L. grandis*.

Umbellules sessile, in racemes 4-6 cm. long; leaves greyish beneath .. 6. *L. artocarpifolia*.

Leaves subcoriaceous, lanceolate, rather small, nerves and nervules strong, branchlets moderately stout .. 7. *L. firma*.

Leaves chartaceous or membranous, small to moderate-sized

Umbellules in short clusters. (Nos. 8-11.)

Branchlets very slender; leaves oblong-lanceolate; umbellules sessile, in clusters of only 2-3 .. 8. *L. gracilis*.

Branchlets moderately stout

Leaves elliptic-lanceolate; umbellules in many-flowered fascicles; fruit ovoid; fruiting perianth very small 9. *L. amara*.

Leaves broadly elliptic or orbicular.

Leaves elliptic, ovate or orbicular, strongly nerved, densely rufous

- hirsute; umbellules in clusters of 3—4 .. 10. *L. hirsutissima*.
- Leaves elliptic or elliptic-oblong, sparsely grey-or tawny-pubescent; umbellules in dense clusters .. 11. *L. polyantha*.
- Umbellules in racemes reaching 10—16 cm. in length; leaves cordate; fruit oblong; fruiting perianth obconic, very small .. 12. *L. cordata*.
- Leaves glabrous or only slightly hairy on the lower surface. (Nos. 13—48.)
- Umbellules in clusters or short racemes (in 15 *L. brachystachya* paniced). Nos. 13—36.)
- Fruit small, under 7 mm. in diameter; fruiting perianth very small, scarcely enlarged. (Nos. 13—15.)
- Umbellules in clusters or very short racemes under 1 cm. long
- Leaves membranous, lanceolate, strongly scented .. 13. *L. citrata*.
- Leaves chartaceous, more or less elliptic, long-petioled .. 14. *L. petiolata*.
- Umbellules in panicles or racemes reaching 4—10 cm. in length, leaves elliptic, chartaceous .. 15. *L. brachystachya*.
- Fruit oblong, 2 cm. by 1 cm., pedicel long, clavate; leaves coriaceous; fruiting perianth small, flattened. 6 mm. in diameter .. 16. *L. angulata*.
- Fruit moderate-sized, about 1 cm. in diam., pericarp thin; fruiting perianth chartaceous, cleft; leaves submembranous, rather large, glaucous beneath .. 17. *L. spathacea*.
- Fruit moderate-sized, 8—15 mm. in diam.; fruiting perianth cup-shaped bearing the remains of the lobes and staminodes. (Nos. 18—19.)
- Leaves oblanceolate, 23—43 cm. long, nearly glabrous, pergamaceous; fruiting perianth thin; umbellules in clusters on branches below leaves .. 18. *L. magnifica*.
- Leaves elliptic-oblong under 25 cm. long; fruiting perianth thick; umbellules in clusters among the leaves or below them
- Leaves chartaceous, young slightly pubescent, transverse nerves prominent; peduncles of

- umbellules slender, up to 12 mm. long .. 19. *L. Ridleyi*.
 Leaves coriaceous, young softly tomentose, transverse nervules obscure; peduncles of umbellules thick, under 5 mm. long.. 20. *L. penangiana*.
 Fruit moderate-sized to large; fruiting perianth with entire margins, the lobes and staminodes deciduous. (Nos. 21-29.)
 Leaves more or less elliptic, usually over 20 cm. long; fruiting perianth thick, cup-shaped; umbellules axillary or lateral among the leaves or a little below them
 Fruit ovoid; fruiting perianth not spotted, rather large and long-pedicelled; leaves chartaceous, more or less ovate, dark reddish-brown when dry, under 10 cm. broad .. 21. *L. castanea*.
 Fruit ellipsoid-oblong, 2 cm. by 1 cm.; fruiting perianth smooth, with short pedicels; leaves coriaceous, more or less ovate, under 4 cm. broad .. 22. *L. quercina*.
 Fruit cylindric-oblong, 2 cm. by under 1 cm.; fruiting perianth rough, with short pedicels; leaves coriaceous, more or less obovate, 4—9 cm. broad .. 23. *L. cylindrocarpa*.
 Leaves more or less oblong, 15—30 cm. long or more; fruiting perianth thick, cup-shaped or saucer-shaped, spotted; umbellules axillary or lateral among the leaves or below them, flowers scarcely known
 Leaves elliptic-oblong or oblong-lanceolate, 3—5 cm. broad, reddish beneath, transverse nervules and reticulation visible; fruit globose, 10 mm. in diam. with a large spotted cup .. 24. *L. Wrayi*.
 Leaves oblong-lanceolate, 4—7 cm. broad, transverse nervules and reticulation obscure; fruit globose, apiculate, 16 mm. in diam., pedicel short .. 25. *L. singaporensis*.
 Leaves oblong-obovate or ob-lanceolate, 5—8 cm. broad,

- transverse nervules and reticulation faint; fruit globose, apiculate, 10 mm. in diam., pedicel long .. 26. *L. perakensis*.
- Leaves elliptic-oblong, 8—14 cm. broad, transverse nervules and reticulation faint; fruit globose, 15 mm. in diam. .. 27. *L. pustulata*.
- Leaves subcoriaceous, oblong or obovate, glaucous beneath, 20—40 cm. long; fruiting perianth patelliform, 10—12 mm. in diam. supporting the globose fruit, 15 mm. in diam. .. 28. *L. patellaris*.
- Leaves pergamaceous, oblong-obovate, 15—35 cm. long, subglaucous beneath; fruiting perianth very large and woody enclosing the globose fruit .. 29. *L. fenestrata*.
- Fruit wanting. (Nos. 30-37.)
- Leaves elliptic, nerves prominently parallel, close, more than 8 pair.
- Leaves cuspidate-acuminate; racemes grey-pubescent .. 30. *L. Foxiana*.
- Leaves acute or acuminate only; racemes nearly or quite glabrous .. 31. *L. monticola*.
- Leaves oblong-lanceolate or oblanceolate, nerves distant and somewhat irregular (Nos. 32-37).
- Leaves lanceolate, long acuminate, areolate; racemes 3—5 mm. long .. 32. *L. Scortechinii*.
- Leaves oblanceolate, greyish-subglaucous beneath, usually under 6 cm. broad, apex with an acumen
- Upper surface of leaves dark; racemes 8—15 mm. long, peduncles 10—12 mm. long .. 33. *L. ochracea*.
- Upper surface of leaves pale; racemes under 7 mm. long, umbellules sessile .. 34. *L. oblanceolata*.
- Leaves oblong-lanceolate, subglaucous beneath; usually over 6 cm. broad, apex rounded; involucre densely grey-puberulous .. 35. *L. Kunstleri*.

- Leaves elliptic-lanceolate or -oblan-
ceolate, acuminate, glaucous be-
neath, nerves distant, 6 pairs;
umbellules subglabrous, peduncles
10—20 mm. long .. 36. *L. claviflora*.
Leaves ovate or elliptic, scarcely 10
cm. long, nerves 4—6 pairs; ped-
uncles glabrous 5 mm. long .. 37. *L. Helferi*, var.
ovata.

Flowers in elongated racemes (in 38 *L. myristicæfolia*
scarcely over 2 cm. long. (Nos. 38—48.)

Leaves narrow, rarely over 7 cm. broad or 20
cm. long, more or less glabrous. (Nos. 38—41.)

Racemes short, glabrous; leaves coria-
ceous; fruiting perianth fleshy, near-
ly at right angles with the long
peduncle, half enclosing the globose
fruit 8 mm. in diam. .. 38. *L. myristicæfolia*.

Racemes moderately long, glabrous
Leaves coriaceous, elliptic-oblong,
abruptly acuminate; racemes
2—5 cm. long; fruiting peri-
anth cup-shaped to flattened;
fruit ovoid to globose, 15—18
mm. in diam. .. 39. *L. Teysmanni*.

Leaves coriaceous, oblong-lanceo-
late, long acuminate; racemes
7—9 cm. long; fruiting peri-
anth hemispheric on an enlarged
clavate pedicel and half enclos-
ing the globose fruit 10 mm. in
diam. .. 40. *L. machiliifolia*.

Racemes up to 17 cm. long, pubescent;
leaves chartaceous, oblong-lanceo-
late, puberulous beneath .. 41. *L. Panamonja*.

Leaves broad. (Nos. 42—48.)

Racemes glabrous

Leaves submembranous, elliptic;
racemes 10—25 cm. long;
branchlets angular, almost wing-
ed; fruit not known .. 42. *L. Curtisii*.

Leaves coriaceous, oblanceolate;
racemes 10 cm. long; branch-
lets rounded; fruit depressed-
globose enclosed in a woody
nest-like cupule about 2 cm.
in diam. .. 43. *L. nidularis*.

Racemes puberulous, up to 15 cm.
long; leaves coriaceous, elliptic-

obovate, up to 45 cm. long and 20 cm. broad; fruit globose 2.5—3 cm. in diam. on a saucer-shaped cupule 25 mm. in diam. .. 44. *L. megacarpa*.

Racemes tomentose or pubescent. (Nos. 45—48.)

Racemes rather short, up to 10 cm. long; leaves coriaceous, oblong-lanceolate with broad midrib; fruiting perianth obconic, 25—30 mm. in diam. .. 45. *L. sebifera*.

Racemes long, reaching 16—20 cm.

Leaves coriaceous, glabrous, oblong or oblanceolate; petiole 4—7 cm. long .. 46. *L. Maingayi*.

Leaves scarcely coriaceous, elliptic-oblong, under surface pubescent; petiole under 4 cm. long

Leaves reddish beneath; fruiting perianth cup-shaped, smooth, 15—20 mm. in diam.; stamens sometimes 6 only ... 47. *L. Noronhæ*.

Leaves greyish beneath; fruiting perianth saucer-shaped, pustulate, 27 mm. in diam. .. 48. *L. robusta*.

Leaves opposite or subopposite, sometimes alternate. (Nos. 49—55.)

Leaves more or less elliptic-lanceolate, under 20 cm. long, 6 cm. broad, glabrous or slightly pubescent.

Leaves long-cuspidate-acuminate; main nerves 5—7 pairs .. 49. *L. sarawacensis*.

Leaves obtuse, acute or only shortly acuminate.

Leaves membranous or chartaceous, main nerves 8—12 pairs; fruit ellipsoid, 5 mm. in diam.; fruiting perianth very small with persistent lobes .. 50. *L. lancifolia*.

Leaves pergamaceous, main nerves 6—8 pairs; fruit cylindric-oblong, 6—7 mm. in diam.; fruiting perianth 7 mm. in diam., lobes deciduous .. 51. *L. gracilipes*.

Leaves obovate-oblong or -oblanceolate, grey- or rusty-pubescent or -tomentose

Leaves membranous to chartaceous, grey-pubescent beneath; transverse nervules and reticulation obscure .. 52. *L. ujongensis*.

Leaves chartaceous, rusty-pubescent beneath,

- transverse nervules and reticulation prominent 53. *L. sessiliflora*.
 Leaves coriaceous, rusty-tomentose beneath, transverse nervules and reticulation obscure.
 Umbellule-peduncles 5—10 mm. long; fruiting perianth saucer-shaped, thin, 10—20 mm. in diam; leaf-tomentum dark brown when dry 54. *L. ferruginea*.
 Umbellule peduncles 10—20 mm. long; fruiting perianth cup-shaped, thick, 17 mm. in diam.; leaf-tomentum light brown when dry 55. *L. Griffithii*.

1. LITSEA CHINENSIS, Lam. Encyc. Méthod. III. 574 (1789).

A small or moderate-sized evergreen tree of variable leaves and inflorescence, pubescence, etc.; branchlets terete, glabrescent; buds perulate, densely silky tawny-pubescent as are the innovations. *Leaves* chartaceous or thinly coriaceous, alternate or subopposite or subverticillate at the ends of the branchlets; lanceolate or oblong or elliptic, sometimes even ovate or obovate, acute or obtuse at apex, usually acute at base; upper surface somewhat shining, closely but markedly minutely reticulate, glabrous except on the midrib, olive green when dry, lower surface paler and varying from glabrous to densely grey-pubescent; 10—25 cm. long, 4—10 cm. broad; midrib broad, pubescent; main nerves about 8—10 pairs, often branched; transverse nervules irregular and distant; reticulation minutely netted; petiole 1—3 cm. long, grey-pubescent to glabrous. *Flowers* in umbellules, in axillary or lateral pedunculate umbels or corymbs up to 5 cm. long, the ♀ rather shorter than the ♂; umbels of 2—5 umbellules on peduncles 5 mm. (♀) to 12 mm. (♂) long; umbellules 12 mm. broad (♂), half that size (♀) with 4 concave pubescent involucre bracts the outer pair orbicular, the inner narrower; flowers in each umbellule about 10 to 12, fewer and much smaller in ♀ than in ♂; pedicels about 2 mm. long; perianth-tube short; perianth-lobes incomplete, sometimes 0, rarely more than 2 or 3, when present linear or spatulate, pubescent. *Stamens* of ♂ flowers normally 12, sometimes fewer, sometimes up to 15 or even more, those of outer rows 10 mm. long, on slender villous filaments and with subquadrate anthers; those of inner rows rather shorter and with a pair of long-stalked clavate glands attached at the very base of the filaments; rudimentary ovary often 0, when present conical and very small. *Staminodes* of ♀ flowers normally 12 sometimes fewer, often more, those of outer rows spatulate, 2 mm. long, with villous filaments,

those of inner rows similar with long-stalked clavate glands as in ♂. *Ovary* ovoid, glabrous; style long, thick; stigma peltate, often lobed. *Fruit* small, 7—10 mm. in diameter, globose, seated on the very slightly enlarged flattened tube of the perianth, about 2 mm. broad; pericarp thin, black or purple; cotyledons hemispherical. Trimen Fl. Ceyl. III. 449; Cooke Bomb. Fl. II. 539; Koord. & Val. Bijdr. X. 134. *L. sebifera*, Pers. Syn. II. 4 (1807); Hook. f. Fl. Br. Ind. V. 157; Prain Beng. Plants 902; Brandis Ind. Trees 536. *L. multiflora*, Bl. Bijdr. II. 564 (1825). *L. glabraria* and *laevis*, Juss. in Ann. Mus. VI. 212. *L. geminata*, Bl. Bijdr. 564. *L. tetranthera* and *platyphylla*, Pers. l.c. *Tetranthera laurifolia*, Blume Mus. Bot. Lugd.-Bat. I. 372; Nees in Wall. Pl. As. Rar. II. 66, III. 30; Meissn. in DC. Prodr. XV. 1. 178; Roxb. Fl. Ind. III. 823; Bot. Reg. t. 893; Wall. Cat. 2550 C. and 2555 A.D.; Brandis For. Fl. 379; Kurz For. Fl. II. 297; Benth. Fl. Austral. V. 305. *T. Roxburghii*, Nees l.c. 65. and 30 and Syst. 515. *T. apetal*a, Roxb. Cor. Pl. II. 25. t. 147 and Fl. Ind. III. 819; Gaertn. f. Fruct. III. 226. t. 222; Wall. Cat. 2554 B. and C. *T. litoralis*, Bl. l.c. 375. *T. glabraria*, *laevis* and *geminata*, Nees Syst. Laur. l.c. *T. tomentosa*, Nees in Wall. l.c. 65 and Syst. Laur. 511. *Glabraria tersa*, Linn. Mant. 276; Miq. Fl. Ind. Bat. 941; *G. litoralis*, Miq. l.c. 943. *Tomex tetranthera* and *sebifera*, Willd. Sp. Pl. II. 839, 840. *Sebifera glutinosa*, Lour. Fl. Cochinch. II. 783. *Laurus involucrata*, Koenig in Retz. Obs. VI. 27.

Malay Peninsula, *vide* Hook. f. in Fl. Br. Ind.; Koord. & Val., etc.—DISTRIB. India, Burma, Ceylon, Andaman Islands, Malay Islands, China, Australia.

There are no specimens of this species from our area in the Kew or Calcutta or Singapore Herbaria; but it seems best to include the description. I have been in doubt whether I should not follow Merrill and call it *L. tersa*, Merrill, in Philipp. Journ. of Sc. I. 57 (1906); but after much consideration have preferred to leave it under the better known name adopted by such authorities as Trimen, Cooke and Koorders & Valetton.

2. *LITSEA TOMENTOSA*, Blume Bijdr. 566 (1825). A tree reaching 15—20 m. in height and a diameter of bole of 45 to 60 cm.; branchlets stout, rough, puberulous, uppermost and innovations tawny-pubescent; buds oblong. *Leaves* membranous when young, chartaceous when older, obovate or oblong-obovate, abruptly short-acuminate at apex, cuneate at base; upper surface shining, puberulous when young, afterwards glabrous except on the midrib and main nerves, lower surface minutely grey-tawny-pubescent; 12—20 cm. long, 4—10 cm. broad; midrib stout, broad, pubescent; main

nerves 12—15 pairs, straight at first afterwards curved near the margin; transverse nervules prominent in old leaves, reticulation minutely netted; petiole 2—3 cm. long, stout, tawny-pubescent. *Flowers* in umbellules, in dense axillary or lateral bracteate clusters on a very short stout common peduncle about 5 mm. long; bracts oblong, densely grey-pubescent without; umbellule-peduncles thick, grey-pubescent, 5 mm. long; involucre bracts 4, orbicular, concave, grey-pubescent without, glabrous within, about 4 mm. in diam.; flowers in umbellule 5, on short pedicels 2 mm. long; perianth-lobes small, incomplete, ovate-acute or sublinear, sometimes missing. *Stamens* of ♂ flowers “20—24 slightly longer than the perianth lobes, with villous filaments; glands about 8—12, obconic, stipitate, hidden in the villous hairs of the tube; rudimentary ovary small glabrous; stigma 0.” *Staminodes* of ♀ flowers many (up to 30) densely imbedded in stiff tawny hairs; those of outer rows spatulate on slender villous filaments, those of inner rows with a pair of stalked clavate glands inserted at the bases of the filaments. *Ovary* ovoid; style thick; stigma large, peltate, often lobed. *Fruit* “ellipsoid, obtuse, about 3 cm. long, 1.5—2.5 cm. broad, seated on the cupular enlarged perianth-tube 2 cm. broad 3 mm. high, the margin irregularly 9—12-toothed or subentire; pedicel obconic, 1.5—2.5 cm. long, often much incurved.” Koord. & Val. Bijdr. X. 138. *Tetranthera vestita*, Nees Syst. Laur. 551; Blume Mus. Bot. Lugd.-Bat. I. 372; Meissn. in DC. Prodr. XV. i. 178. *Glabraria vestita*, Miq. Fl. Ind. Bat. I. 941. *Polyadenia grandis*, Hassk. Cat. Bog. 566, non Nees.

PENANG: at West Hill, 75 m. alt., *Curtis* 1182!; in dense jungle at Larut 90—150 m. alt., *King's Collector* 5886!—DISTRIB. Java.

The leaves of *Curtis* specimens are thicker and stouter than those of *Kunstler*, but they are older; and the inflorescence (♀ in both) is the same. This is apparently the oldest use of the specific name *tomentosa*: the S. Indian *L. tomentosa*, Wall. Cat. 2550 will have to be called *L. apetala*. The descriptions of the stamens (♂) and fruit are taken from *Koorders* and *Valeton*. The Javan specimen in *Herb. Kow* (♀) has the leaves rather broader and more obovate than is the case with the Peninsular ones; but in other respects it agrees, and I see no reason to doubt the identification.

3. *LITSEA JOHORENSIS*, Gamble in Kew Bull. 315 (1910). A small evergreen tree with smooth white bark; branchlets grey, rather slender, the uppermost densely red-brown-tomentose as are the lanceolate buds, the petioles and undersurface of the leaves and the inflorescence. *Leaves* coriaceous, alternate, somewhat crowded to-

wards the ends of the branchlets; oblanceolate, acuminate usually abruptly at apex, long attenuate at base; upper surface dark brown and dull when dry, glabrous except the puberulous midrib and main nerves, areolate reticulate, lower sparsely tomentose purplish-red when dry; 10—30 cm. long, 4—10 cm. broad; midrib rather slender, impressed above; main nerves 10—14 pairs impressed above, starting at about 70° with the midrib and at once curving upwards to and along the margin; transverse nervules rather irregular and branched, not very prominent, enclosing the areolate reticulation; petiole rather slender from a thickened base, channelled above, 1.5—3.5 cm. long. *Flowers* in umbellules on slender tomentose peduncles 15 mm. long (♂) several together on hard woody tubercles with rugosely scarred cylindric branches up to 18 mm. long on the tree-trunk; the umbellules when open reaching 15 mm. in diam. (♂), or 10 mm. (♀); involucre bracts 4—5, orbicular, concave, tomentose without, glabrous within; flowers in each umbellule 6—7, subsessile; perianth-lobes 6, oblong or spatulate, obtuse, sparsely villous, 5—7 mm. long, much gland-dotted. *Stamens* of ♂ flowers variable in number, normally 9, but often 10, those of the outer rows up to 9 mm. long with large 3 mm. long oblong anthers and slender slightly villous filaments, sometimes with 1 or 2 small glands at the base, those of the inner row shorter and with a pair of reniform and usually emarginate shortly stipitate glands at the base itself; anther-cells very large, elliptic-oblong, the upper introrse, the lower lateral; rudimentary ovary ovoid; style thick; stigma spreading, bifid. *Staminodes* of ♀ flowers variable in number, normally 9 but often up to 12, those of the outer rows linear subulate, slender, slightly villous, 3 mm. long, sometimes with glands at their bases; those of the inner rows triangular-acuminate with 2 large basal glands, 1 mm. long. *Ovary* ovoid, glabrous; style thick, curved; stigma large, peltate, irregularly lobed. *Fruit* (immature) ovoid, truncate at apex, apiculate, half-enclosed in the hemispheric rough persistent perianth-tube 6 mm. long and 10 mm. in diam. at the mouth which is entire or lobed and bears remains of the perianth-lobes and staminodes; enlarged pedicel very stout, short; pericarp smooth.

JOHORE: at Tanyong Bunga, *Ridley* 6458!, near Castlewood, *Ridley* 9163!, at the Mount Austen, *Ridley* 11995!, at Seduah, *Ridley* 13479!

This species comes rather near to *L. cauliflora*, Stapf in Trans. Linn. Soc. 2nd Ser. IV. 219 collected by Haviland on Mt. Kinabalu in Borneo at 5000 ft.,

but the venation of the leaves is different and the umbellules are much larger. The specimens of the ♀ flowers and young fruit were found separate with Ridley's No. 6458 which is otherwise ♂; they must have been collected on a different tree.

4. *LITSEA TRUNCIFLORA*, Gamble in Kew Bull. 316 (1910). A handsome evergreen tree reaching 18 m. in height and 30—40 cm. in diam. of stem; bark of stem greyish-brown, smooth; branchlets rather stout, pale brown, the uppermost and lanceolate buds and the petioles of the leaves dark brown rusty-tomentose. *Leaves* chartaceous, alternate; obovate or oblanceolate, rounded or emarginate at apex, long-cuneate-attenuate at base; upper surface shining, glabrous except the villous midrib, areolate-reticulate, lower blue-green when fresh, pale grey-brown when dry, softly rusty-tomentose especially on the nerves; margin recurved; 28—56 cm. long, 11—22 cm. broad; midrib very stout, impressed above, much raised beneath; main nerves 16—22 pairs, impressed above, prominent beneath, often branched and with secondary nerves between, starting usually at from 70°—80° or sometimes at right angles to the midrib, at first straight but curving near the margin to meet in irregular loops; transverse nervules distant, irregular, often branched, prominent, enclosing the areolate reticulation which is best seen on the upper surface; petiole very stout, flattened above, 1.5—2.5 cm. long. *Flowers* in umbellules on rather slender pubescent peduncles 10—15 mm. long (♂) 7—8 mm. (♀) many together on hard thick woody tubercles on the tree-trunk, the clusters about 5 cm. in diam.; umbellules (♂) 10—12 mm. in diam. when open; involucre bracts 4, orbicular, concave, minutely puberulous without, glabrous within; flowers in each umbellule 4—5, sessile; perianth-lobes 6, very variable, mostly linear-oblong, toothed at the apex, sparsely villous, gland-dotted, 5—6 mm. long. *Stamens* of ♂ flowers variable in number, usually 9 or 12; those of the outer rows 7—8 mm. long with oblong anthers and very slender villous filaments, sometimes with glands at the base; those of the inner rows shorter and with a pair of rounded often emarginate very shortly stipitate glands close to the base; anther-cells very large, elliptic, upper all introrse, lower lateral; rudimentary ovary ovoid; style slender, much curved, glabrous; stigma large, peltate, bifid. *Staminodes* of ♀ flowers apparently all with basal glands, outer linear-clavate, villous, 3 mm. long, inner shorter, the glands thick. *Ovary* ovoid; style slender, straight; stigma peltate. *Fruit* (very unripe) depressed globular, enclosed almost completely in the turbinate enlarged perianth-tube

which when young is nearly globular with a small orifice bearing remains of the perianth-lobes and staminodes.

PERAK: open jungle in Gopong District at 150—300 m. alt., *King's Collector* 4582!, 8211! *Herb. Singap.* No. 448 (♀)! Vern. 'Suko Medang Kunit', without locality.

This species, to judge by leaf-specimens, which is all that is available (in *Herb. Calc.*) of *Tetranthera? ochrascens*, Miq. *Fl. Ind. Bat. Suppl. I.* 146, 363, comes very near that species; but the venation does not fully agree.

5. *LITSEA GRANDIS*, Hook. f. in *Fl. Br. Ind. V.* 162 (1886). A large tree reaching 25 to 30 m. in height and 60—90 cm. diam. of stem; bark warted; branchlets very stout, angular, the upper ones densely tawny-tomentose; buds ovoid, 1—3 cm. long, velvety. *Leaves* coriaceous, alternate; broadly obovate or orbicular-ovate or -obovate, generally obtuse but sometimes acute or shortly acuminate at apex, attenuate or rounded or sometimes subcordate at base; upper surface dull or shining, glabrous except the midrib and main nerves, lower densely rusty-tomentose; margins recurved; 10—30 cm. long, 5—18 cm. broad; midrib very stout, flat and tomentose above or sometimes impressed, prominent beneath; main nerves 12 to 20 pairs, divergent from the midrib at from 60°—70°, straight to near the margin where they curve upwards, deeply impressed above, raised beneath; transverse nervules very many and prominent, regular, ladder-like; reticulation in the intervals again more or less transverse; petiole very stout, 2—4 cm. long. *Flowers* in pedunculate (7—15 mm.) umbellules in short (up to 10 mm.) axillary or lateral thick racemes of about 10; involucre bracts 5, orbicular, concave, densely greyish silky tomentose without; open umbellules 10 mm. broad in ♂, 7—8 mm. in ♀; flowers in each umbellule 5—7 in ♂, 4—5 in ♀; pedicels stout; perianth-tube short, lobes linear-oblong in ♀, lanceolate-acute in ♂, silky, about 4 mm. long, 6—8 in ♂, fewer in ♀. *Stamens* in ♂ flowers normally 12, but frequently more, up to 21; those of the 2 outer rows normally eglandular, but frequently with 1 or more stipitate glands, anthers short truncate at base, rounded above, filaments very slender, sparsely strigose, 3—4 mm. long; those of the inner rows shorter and with a pair of small clavate stipitate glands at the base; upper anther-cells introrse, lower lateral; rudimentary ovary 0. *Staminodes* of ♀ flowers normally 12; those of outer rows clavate, 2 mm. long, the filaments villous; those of inner rows linear and with a pair of shortly-stalked small glands at the base. *Ovary* ovoid, glabrous; style thick, bent

to a hook at the top; stigma peltate, lacerate. *Fruit* ellipsoid, 11—16 mm. long, 8—10 mm. broad, seated on the obconical thin enlarged perianth-tube, 5—7 mm. high, 8 mm. in diam., the margins sharp, entire crenulate or sometimes cleft; pedicels much thickened, 6 mm. long; pericarp yellowish, shining, smooth, glabrous. Brandis Ind. Trees 537. *Tetranthera grandis*, Wall. Cat. 2552; Meissn. in DC. Prodr. XV. 1. 188; Kurz. For. Fl. II. 299. *Polyadenia grandis*, Nees in Wall. Pl. As. Rar. II. 62 and Syst. Laur. 574.

PENANG: *Porter* (Wallich 2552)!; on Government Hill, *Curtis* 1104!. PERAK: at Lower Camp, Gunong Batu Pateh, *Wray* 1100!, 1157!; in hilly country at 150—300 m., *King's Collector* 5888!, 10918! MALACCA: *Maingay* K. D. 1256!. SINGAPORE: at Chanchukang, Changi, Bukit Timah, etc. *Ridley* 3962!, 4700!, 5062!, 5974!, 5975!, 6452!, 10698!, 10802!, 10859!; *Cantley* 116!—DISTRIB. Burma, Java?

6. *LITSEA ARTOCARPIFOLIA*, Gamble in Kew Bull. 316 (1910). An evergreen tree; branchlets very stout, rough, brown, marked with lenticels and large leaf-scars, uppermost and large ovate-lanceolate buds densely rusty-pubescent. *Leaves* coriaceous, alternate; obovate, obtuse or slightly apiculate at apex, attenuate at base; upper surface shining, glabrescent except on the midrib and nerves, lower surface grey, closely rusty-pubescent; margin recurved; 20—25 cm. long, 9—12 cm. broad; midrib stout, very broad (4 mm. near base) depressed above, much raised beneath; main nerves about 20 pairs, regular, parallel, impressed above, prominent beneath, at about 60°—70° with the midrib, at first straight then curving to join the margin; transverse nervules many, prominent, straight or branched; reticulation obscure; petiole very stout, 10—15 mm. long, channelled above. *Flowers* in sessile or very shortly peduncled umbellules, closely packed in rusty-pubescent racemes 4—6 cm. long from the axils of fallen leaves on the last shoot; umbellules (♂ only) when open 15 mm. in diam.; involucrel bracts 5, orbicular, concave, enclosing 6 flowers; pedicels stout, villous, 4 mm. long; perianthlobes 6—8, oblong-lanceolate, acuminate, silky-villous on both sides, 5 mm. long. *Stamens* of ♂ flowers 9—15, apparently normally 12, of which those of the outer rows 8 mm. long, eglandular or sometimes with glands; those of the inner rows a little shorter, and furnished with a pair of large reniform often emarginate stipitate glands a little above the bases of the villous slender filaments; anthers obovate, the upper cells introrse, the lower lateral; rudimentary

ovary 0 or very small with small capitate stigma. *Staminodes* of ♀ flowers and *fruit* not known.

PERAK: at Relan Tujur, Wray 2233 !.

In leaf this species resembles *L. grandis* but differs in the much longer racemes, the nearly sessile umbellules, the broader leaf-midrib and other points.

7. *LITSEA FIRMA*, Hook. f. in Fl. Br. Ind. V. 162 (1886). A very large tree, reaching a height of 30—40 m. and a diameter of 1 metre or more; branchlets moderately stout, greyish-brown, the uppermost and innovations minutely rusty puberulous; buds lanceolate, not perulate. *Leaves* subcoriaceous, alternate; oblong-lanceolate or oblanceolate, obtuse or acute, rarely acuminate at apex, cuneate often unequally at base; upper surface dull, glabrous, reddish-brown, lower minutely reddish or greyish rusty-puberulous, at length glabrous; 8—18 cm. long, 3—5 cm. broad; midrib moderately stout, somewhat channelled on the upper surface, much raised on the lower; main nerves 10—15 pairs, rather irregular, curving upwards to and along the margin, more or less impressed above; transverse nervules many and conspicuous on the under surface, often branched or irregular; reticulation areolately pitted on the upper surface (under the lens); petiole 1—2 cm. long, rather slender. *Flowers* in peduncled (5—7 mm.) umbellules in rusty-pubescent axillary or lateral umbelliform racemes of about 5—6; umbellules in ♂ about 7 mm. in diameter with 4—6 concave orbicular involucre bracts; flowers in umbellule 5—6, shortly pedicelled; perianth-tube in ♂ very short; lobes oblong, tawny-villous, 2—3 mm. long, subacute, those of ♀ slightly smaller. *Stamens* in ♂ flowers 9, those of the 2 outer rows eglandular 6—8 mm. long, with long filiform sparsely hispid filaments and oblong anthers, those of the inner row similar or rather shorter with smaller anthers and a pair of reniform stipitate glands at the bases of the filaments; lower anther-cells lateral, upper large and introrse in the outer rows, minute or even wanting in the inner row; rudimentary ovary 0. *Staminodes* of ♀ flowers linear, subulate, with hispid filaments 2—3 mm. long, the inner three with a pair of reniform stipitate glands at the base. *Ovary* not seen. *Fruit* ovoid-oblong, truncate at apex, 10—12 mm. long, 8 mm. broad, seated on the shallow obconic enlarged perianth-tube 3 mm. high, 6—7 mm. in diameter; enlarged pedicel stout, 5 mm. long; pericarp pink when ripe, smooth. *Tetranthera firma*, Blume Mus.

Bot. Lugd.-Bat. I. 381; Meissn. in DC. Prodr. XV. 1. 190; Miq. Fl. Ind. Bat. I. 950.

PERAK: hills near Larut at 120—180 m. alt., *King's Collector* 6772!, 7931!. MALACCA: *Maingay* K. D. 1271!; *Kofar Ali* 4!. SINGAPORE: at Bukit Timah, *Ridley* 6453!, at Chauchukang 6820!—DISTRIB. Sumatra, at Bigin Telok, 150 m. alt., *Forbes* 3239!; Borneo, *Korthals*; Celebes.

Ridley's specimens have the leaves more rusty-puberulous and the young fruit cupules nearly globose with small orifice, but the orifice widens later on to a shallow cup; and I see no reason to doubt their identity.

8. *LITSEA GRACILIS*, Gamble in Kew Bull. (1910). A small tree; branchlets very slender, densely tawny-pubescent, innovations silky. Leaves membranous, alternate; oblong-lanceolate, acuminate at apex, attenuately acute at base; upper surface shining, glabrous except on the midrib; lower sparsely villous, closely so on the midrib and main nerves; 8—14 cm. long, 2—4 cm. broad; midrib slender, slightly impressed above; main nerves 8—10 pairs, starting at about 70° with the midrib and curving at once upwards to and along the margin and breaking up in small diminishing loops; transverse nervules irregular, branched; reticulation obscure; petiole slender, 4—5 mm. long. Flowers in small pale brown umbellules on very slender short (·3 to ·4 mm.) peduncles, 2—3 together in the axils of upper leaves; umbellules of ♂ 4 mm. in diam. in flower; involueral bracts 4, straw-coloured, membranous, villous without, glabrous within, ovate, concave; flowers in each umbellule 3, pedicels minute; perianth-lobes very thin, obovate, villous outside, gland-dotted, 1—1·5 mm. long in ♂, under 1 mm. in ♀. Stamens of ♂ flowers 9, exsert, those of the outer rows 6, nearly 2 mm. long with small obovate anthers and slender long-pilose filaments; those of the inner row 3, similar but shorter and with a pair of rounded subsessile glands at the bases of the filaments; rudimentary ovary 0. Staminodes of ♀ flowers 9, minute, those of the outer rows 6, clavate, with pilose filaments, those of the inner row 3 subulate with a pair of rounded glands at the base. Ovary globose; style thick, curved; stigma peltate, 3-lobed. Fruit (unripe) obovoid, apiculate, seated on the thick enlarged perianth-tube, the lobes and staminodes persistent.

PERAK: at Temango, *Ridley* 14603! (both ♂ and ♀ branches).

A very interesting and pretty species, which looks as if it were deciduous,

but there is no information about this. The flowers are very small and delicate.

9. *LITSEA AMARA*, Blume Bijdr. 563 (1825). An evergreen shrub or small tree reaching at most 12—15 m. in height and 30—40 cm. in diam. of stem; branchlets moderately stout, somewhat angled and sinuate, the uppermost and innovations rusty-tomentose. *Leaves* chartaceous when dry, alternate, very variable in shape and pubescence; elliptic or elliptic-lanceolate, obtuse or acute at apex, acute or cuneate or rounded at base; upper surface smooth, shining, lower rusty-villous, often glaucescent; 7—15 cm. long, 3—7 cm. broad; midrib prominent, channelled above, raised beneath; main nerves 8—16 pairs, spreading, curved near the margin, the lowest close, impressed above, prominent beneath; transverse nervules many, slightly arched, subparallel, also impressed above; reticulation areolate; petiole rusty-tomentose, 4—10 cm. long. *Flowers* in short-peduncled (about 5 mm.) umbellules, in few- or many-flowered racemose axillary or lateral rusty-pubescent fascicles; umbellules up to 8 mm. broad in ♂, 6 mm. in ♀, with 4—5 orbicular concave involueral bracts; flowers in each umbellule 5—7, with short pedicels; perianth-tube short, villous within with long hairs; lobes 6, unequal, from linear-oblong to obovate, glabrous or nearly so, 2—3 mm. long. *Stamens* in ♂ normally 9, those of the 2 outer rows 3—3.5 mm. long with oblong anthers and slender filaments long villous especially at base; those of the 3rd row shorter and with a pair of large subsessile reniform glands near the bases of the filaments; rudimentary ovary 0. *Staminodes* of ♀ flowers 9 to 12, those of the 2 outer rows slender, clavate, 1—1.5 mm. long, those of the inner rows subulate or clavate 1 mm. long with a pair of large reniform glands as in ♂. *Ovary* ovoid; style thick, curved above; stigma large, peltate, lobed. *Fruit* ovoid, apiculate, 8 mm. long, 6 mm. broad, seated on the only slightly enlarged perianth-tube, which is 5 mm. in diam. at the mouth and bears the remains of the perianth-lobes and staminodes; fruiting pedicel obconic, greatly thickened, up to 5 mm. long, glabrous; pericarp smooth. Hook. f. Fl. Br. Ind. V. 163; Koord. & Val. Bijdr. X. 150; Brandis Ind. Trees 536. *Tetranthera amara*, Nees Syst. Laur. 551; Bl. Mus. Bot. Lugd.-Bat. I. 379; Miq. Fl. Ind. Bat. I. 1. 949; Meissn. in DC. Prodr. XV. 1. 190; Kurz. For. Fl. II. 299. *T. fruticosa*, Nees l.c. 543. *T. capitulata*, Miq. Pl. Jungh. I. 182 and Fl. Ind. Bat. l.c.

KEDAH: at Yan, Ridley 5491!; Rawi island 15697!. PENANG:

Wallich 7878!, 8005; *Phillips*!; *Curtis* 326!, 733!, 1073!, 1458!; *Ridley* 9340!. PERAK: at Tapa Simpang and Tupai, *Wray* 1260!, 2038!, 2047!, 2330!, 3603!; at Tapa Temango, etc., *Ridley* 14046!, 14505!, 14508!, 14583!; *Scortechini*!; Tea Gardens, *Ridley* 2981!; near Larut, *King's Collector* 998!, 2040!, 2584!, 3033!, 3431!, 3505!, 4494!, 5927!, 7626!, 7859!. SELANGOR: at Ulu Selangor and Bukit Kutu, *Goodenough* 10544!, 10545!; at Kepong, *Burn-Murdoch (Ridley)* 14285!; at Kwala Lumpur, *Ridley* 7626!. MALACCA: *Maingay K. D.* 1276!; *Griffith*!. SINGAPORE: *Ridley* 4825!. —DISTRIB. Burma, Malay Archipelago.

There is a huge amount of material available for the study of this polymorphic species. The old specimens of the Calcutta Herbarium were fortunately carefully arranged some years ago by Sir George King according to varieties. According to this arrangement, the most general form, that apparently described as such in the Fl. Br. Ind., is the var. *ochracea*, Blume, which is described above and that most easily separable is var. *fusco-tomentosa*, Meissn., which is maintained in the Fl. Br. Ind. and often has stamens with only 2 cells. Were it not for Sir George King's careful work, I should have preferred to follow Koorders and Valetton and treat the whole species as one with forms gradually passing from one to the other, but I think var. *fusco-tomentosa* above-mentioned and var. *angusta*, Meissn., also admitted in the Fl. Br. Ind., are clear enough. I have further added var. *attenuata*, the form with large leaves long acuminate at apex and attenuate at base; but of this I have more doubt, for the specimens graduate into the general form on the one hand and into *angusta* on the other.

Var. *fusco-tomentosa*, Meissn. l.c. Leaves, branchlets and innovations densely villous with long golden-tawny hairs; the leaves variable, usually ovate or ovate-oblong but sometimes even oblanceolate or obovate, usually cuspidate-acuminate at apex, rounded at base but occasionally acute, the length often up to 20 cm., the breadth to nearly 10 cm.; main nerves up to 20 pairs, the lowest pairs close together; branchlets often zigzag. Flowers as in type, but stamens often only 2-celled, apparently by loss of the partitions between the upper and lower cells. Hook. f. Fl. Br. Ind. V. 163.

PERAK: at Gunong Ijuk, *Scortechini*!; at Simpang and Tupai Larut, *Wray* 2047!, 2330!. NEGRI SEMBILAN: at Gunong Angsi, *Ridley* 11895!. TRINGGANU: at Bundi, *Rostado*!. MALACCA: *Griffith K. D.* 4293!; *Maingay K. D.* 1251; at Sungli Hudang, *Goodenough* 1595!. JOHORE: near Gunong Panti and at Tebong Tinggyi, *Ridley* 4156! 11050!

The many specimens with only 2-celled anthers have puzzled me considerably, other characters being decidedly those of *Litsea* and not of *Lindera*.

I can only think that it is a case where the perhaps rather artificial distinction between the species having 4 and 2 cells respectively fails, as Sir D. Brandis has shown that it also fails in *Lindera*.

Var. *angusta*, Meissn. l.c. ; Hook. f. in Fl. Br. Ind. l.c. Leaves glabrescent, often grey or silvery beneath, lanceolate or oblanceolate, acuminate at apex, attenuate at base. Flower-clusters axillary or lateral, ♂ with many or ♀ with few umbellules; rudimentary ovary in ♂ sometimes present, lanceolate, with long style and small capitate stigma. *Tetranthera angusta*, Wall. Cat. 6344; Nees in Wall. Pl. As. Rar. III. 30 and Syst. Laur. 641.

KEDAH: Langkawi island, *Curtis* 2610!; *Ridley* 14965!. PENANG: *Wallich* 6344!. PERAK: Upper Perak, *Wray* 3559!; Gunong Bubu, *King's Collector* 6772!, 7620!. MALACCA: *Griffith* K. D. 4295!; Sungei Udang, *Derry* 524!; Gunong Sedang, *Ridley*!; Bukit Tampu, *Goodenough* 1957!. PAHANG: Pekan, *Ridley* 2266!—DISTRIB. Burma.

Var. *attenuata*, King in Herb. Calc. Leaves oblong-lanceolate or -oblanceolate, acuminate at apex, narrowed or rounded at base, often nearly 20 cm. long, minutely rusty-pubescent beneath. Flower clusters with few or many umbellules, these with rather long peduncles.

PENANG: Penang Hill, Batu Feringy, etc., *Ridley* 9473!, etc. PERAK: Larut, Ulu Selangor and Ulu Bubong, *King's Collector* 4614!, 8750!, 10142!. SELANGOR: at Weld's Hill, *Burn-Murdoch* 4!. MALACCA: *Maingay* K. D. 1266!, 1278!; at Batu Tiga, *Derry* 990!. PAHANG: at Kwala Luit, *Ridley* 2265!, at Telun, *Ridley* 13781!.

10. *LITSEA HIRSUTISSIMA*, Gamble in Kew Bull. 357 (1910). A shrub reaching 2.5 m. in height; branchlets rather stout, nearly black, the younger ones clothed with long golden hairs as are the innovations, the margins and nerves of the leaves and the inflorescence. Leaves soft, membranous, alternate; elliptic or elliptic-ovate, acuminate and often with a long (10—15 mm.) filiform acumen at apex, more or less rounded at base; upper surface dark green when fresh, chestnut-brown and shining when dry, the younger with prominent scattered golden stiff hairs the older glabrescent, under surface paler similarly hirsute especially on the nerves; 15—20 cm. long, 7—12 cm. broad; midrib rather slender, channelled above; main nerves 12—15 pairs, impressed above, regular and regularly curved to the margin; transverse nervules many, subparallel, conspicuous; reticu-

lation obscure; petiole stout, 1—2 cm. long, densely golden-hirsute, often geniculate at the leaf-insertion. *Flowers* in umbellules on slender, 1 cm. long, peduncles, clustered in the axils of the leaves, rarely more than 3—4 together; involueral bracts 4, concave, nerved, the margins fimbriate, hirsute without, glabrous within; flowers in each umbellule 5—6; perianth-lobes oblong, 2—3 mm. long, very glandular, nearly glabrous, the apex dentate; pedicels very short. *Stamens* of ♂ flowers 9; filaments slender, glabrous except a tuft of long hairs at their bases; anthers 4-celled, those of outer rows obovate, those of the inner row ovate with a pair of large sessile glands a little above the base of the filaments, rudimentary ovary 0. *Staminodes* of ♀ flowers and *fruit* not known.

PERAK: road to Gunong Hijan, 750 m. alt., *Curtis* 1344!; Goping and Thaiping 90—150 m. alt., *King's Collector* 404! 8399!

Var. *geniculata*, Gamble. *Branchlets* prominently geniculate at the nodes. *Leaves* smaller (8—12 cm. long, 6—7 cm. broad), ovate or orbicular, obtuse and sometimes slightly apiculate at apex, subcordate at base, bullate; upper surface shining, glabrous. *Flowers* similar but anthers sometimes 2-celled or with very minute upper cells, filaments sparsely hirsute.

PERAK: at Goping, *King's Collector* 878!

This variety comes very near indeed to extreme forms of *L. amara*, var. *fusco-tomentosa*, and may be said to be a connecting link between the two species.

11. *LITSEA POLYANTHA*, Juss. in Ann. Mus. VI. 211 (1805). A moderate-sized evergreen tree, reaching 12—18 m. in height and 50—60 cm. in diam. of stem; bark dark grey; branchlets moderately stout, somewhat angular, dark brown, the uppermost and innovations with more or less tawny pubescence; buds lanceolate, leafy. *Leaves* soft when fresh, chartaceous when dry, alternate, sub-bifarious; elliptic or elliptic-oblong or suborbicular, obtuse or slightly acute at apex, rounded at base or nearly subacute; glabrous and dull on the upper surface, grey- or tawny-pubescent on the lower sometimes nearly glabrous; 7—15 cm. long, 4—10 cm. broad; midrib rather slender, impressed on the upper, raised on the lower surface; main nerves 8—12 pairs, at about 60° with the midrib at first then curving to the margin, impressed above; transverse nervules many, parallel and prominent beneath, joined again by subparallel reticulations; petiole pubescent, 12—25 mm. long. *Flowers* in pedunculate (6—12 mm. long)

umbellules, many together in short axillary or lateral tawny-pubescent bracteate racemes 5—6 mm. long, several such racemes together often forming dense cylindric clusters of flowers around the branchlets; umbellules when open 10—12 mm. broad in ♂, 8 mm. in ♀; involucral bracts 4—5, orbicular, concave, reflexed in flower; flowers in each umbellule 5—6; perianth-tube short, on a 2—3 mm. long villous pedicel; lobes usually 6, very variable in shape, from linear-oblong to elliptic or obovate, ciliate, glandular-punctate, 2—3 mm. long. *Stamens* in ♂ flowers normally 9, an outer row of 3 eglandular, a second row of 3 1—2-glandular, a 3rd row of 3 opposite the first biglandular, but sometimes there is a 4th row of 3 biglandular and occasionally a few more, the outer rows slightly longer than the inner, up to 4 mm. in all; glands large, reniform, stipitate, attached to the slender villous filaments near the base; upper anther-cells all introrse, lower lateral or extrorse; rudimentary ovary 0. *Staminodes* in ♀ flowers in similar number and arrangement, the outer rows clavate with slender villous filaments 2 mm. long, the inner subulate thick 1.5 mm. long, the glands very large. *Ovary* ovoid; style thick, slightly curved; stigma broad, peltate. *Fruit* ellipsoid, 7—10 mm. long, seated on the slightly enlarged perianth-tube 4 mm. broad, with somewhat reflexed entire margins; enlarged pedicel 7 mm. long hardly thickened; pericarp smooth, black; cotyledons hemispherical. Hook. f. Fl. Br. Ind. V. 162; Prain Beng. Plants 903; Brandis Ind. Trees 536; Koord. & Val. Bijdr. X. 147. *L. monopetala*, Pers. Syn. II. 4. *Tetranthera monopetala*, Roxb. Cor. Pl. II. 26, t. 148 and Fl. Ind. III. 821; Nees in Wall. Pl. As. Rar. II. 66 and Syst. Laur. 525; Blume Mus. Bot. Lugd.-Bat. I. 378; Meissn. in DC. Prodr. XV. 1. 189; Miq. Fl. Ind. Bat. I. 948; Brandis For. Fl. 380, t. 45; Kurz For. Fl. II. 299. *T. macrophylla*, Wall. Cat. 2549. *T. alnoides*, Miq. Pl. Jungh. 180 and Fl. Ind. Bat. l.c. *T. hexantha*, Sieb. Fl. Maurit. 92.

PENANG: *Maingay* K.D. 1277!; Government Hill, *Curtis* 283!; Government Hill and Balik Pulau, *Ridley* 6371!, 7065!, 9731!, 10352!. PERAK: Gunong Pundo, *King's Collector* 8326! PAHANG: at Pulau Tawar, *Ridley* 2271!; at Sungei Telai, *Machado* 11553!; at Kwala Tembeling, *Ridley's Collector*! (these two with more glabrous involucre).—DISTRIB. Northern India, Burma, Java, China.

12. *LITSEA CORDATA*, Hook. f. in Fl. Br. Ind. V. 177 (1886). A spreading evergreen tree reaching 15 m. in height, occasionally 30 m. with a diameter of 90 cm. (Kunstler 8269); branchlets rather

slender, smooth, black when dry, the uppermost rusty-tomentose as are the innovations. *Leaves* membrano-chartaceous, alternate; broadly ovate or ovate-oblong, acute or acuminate at apex, cordate at base sometimes unequally; upper surface smooth, shining, glabrous except on the nerves, lower rusty-tomentose, dark reddish-brown when dry; 10—17 cm. long, 6—10 cm. broad; midrib slender above and channelled, stouter below; main nerves 10—14 pairs, impressed above, raised beneath, the lowest 1—2 pairs curved downwards and then up, the rest at 50°—70° with the midrib at first straight then curved to near the margin where they fade away in diminishing loops; transverse nervules prominent, straight or slightly curved, sometimes branched, enclosing the minutely areolate reticulation; petiole rather slender, 10—25 mm. long, often rugose. *Flowers* in umbellules on slender peduncles 7—10 mm. long in ♂, 4—5 mm. in ♀, in slender puberulous axillary erect or drooping racemes reaching to 16 cm. long in ♂, barely 10 cm. in ♀; rachis angled; raceme bracts small, ovate, tomentose, 1—2 mm. long, caducous; umbellules 7—8 mm. in diam. when open; involucre bracts 5, slightly puberulous without, glabrous within, the outer 3 orbicular concave, the inner 2 obovate and much smaller; flowers in each umbellule 6, on very short golden-villous pedicels; perianth tube short, long-pilose within, lobes 6, oblong, obtuse or acute, glabrous except for a few long pilose hairs on the back, ♂ 3 and ♀ 2 mm. long, gland-dotted, those of ♀ early deciduous. *Stamens* of ♂ flowers 12, those of the outer rows 3 mm. long with ovate anthers and slender filaments bearing long pilose hairs in tufts near the base, those of the inner rows similar but shorter with a pair of large oblong sessile glands a little above the bases of the filaments; rudimentary ovary ovoid, thickly pilose with twisted style and capitate stigma. *Staminodes* of ♀ flowers also normally 12, sometimes fewer in inner rows, those of the outer rows clavate about 1 mm. long, the filaments bearing a tuft of pilose golden hairs as in ♂, those of the inner rows subulate, scarcely shorter, with a pair of large oblong subsessile glands a little above the base. *Ovary* ovoid, apparently glabrous; style thick, curved; stigma peltate, lobed. *Fruit* oblong, acute, glossy dark red when fresh, black when dry, up to 2 cm. long, 9 mm. broad, seated on the slightly enlarged perianth-tube, which at first is somewhat cup-shaped enclosing the base of the fruit, afterwards slightly obconic, spreading and flattened, about 5 mm. in diam., the margins smooth; enlarged pedicel about 1 cm. long; pericarp smooth, thin; cotyledons semi-

oblong. *Tetranthera cordata*, Jack in M'Clelland's Calc. Journ. Nat. Hist. IV. 356; Walp. Ann. Bot. Syst. I. 578; Meissn. in DC. Prodr. XV. 1. 196. *T. cordifolia*, Meissn. l.c.

PERAK: at Assam Kumbong, Sungie Larut, Thaipeng, etc., Wray 2126!, 2462!, 2871!, 3045!; *Scortechini*!; road to Campar, Ridley 9597!; dense jungle on low ground and hills up to 180 m. alt. near Larut, King's Collector 3176!, 3962!, 5180!, 6529!, 8269!, 10824!. SELANGOR: at Kerling, Goodenough 10537!. MALACCA: Griffith 4298!; at Sungei Udang, Goodenough 1353!. JOHORE: at Kota Tinggyi, Ridley 4226!; at Bukit Murdon, Lake and Kelsall 4027!. SINGAPORE: at Kranji, Ridley's Collector 6743!; at Bukit Timah, Kunstler 353!—DISTRIB: Sumatra; Borneo (near Kuching, Sarawak, Haviland and Hose 1807!; at Rejang, Sibul, Haviland and Hose 3654 C!);

The flowers of the Borneo specimens are slightly larger than those from the Peninsula, but the specimens are better developed and the structure is the same.

13. *LITSEA CITRATA*, Blume Bijdr. 565 (1825). A deciduous (?) shrub or small tree reaching 10—12 m. in height with 15—20 cm. diameter of stem, all parts orange-scented; branchlets slender, smooth, nearly black when dry, leaf-buds naked, acuminate, tawny-puberulous. *Leaves* membranous; lanceolate, attenuately acuminate at apex, attenuate or cuneate or sometimes rounded at base; upper surface smooth, shining, glabrous, olivaceous or blackish, lower glaucous; 7—13 cm. long, 2—4.5 cm. broad; midrib slender, dark and prominent on the lower surface; main nerves 10—12 pairs at first at nearly 80° with the midrib then curving to and along the margin, secondary nerves rather prominent, transverse nervules and reticulation prominent on the upper surface when dry; petiole slender, 10—18 mm. long, glabrous. *Flowers* in axillary or lateral umbelliform racemes bearing on peduncles about 5 mm. long about 7 involucrate umbellules; involucre of 4 concave nearly glabrous bracts; flowers in each umbellule 5 on slender puberulous pedicels; perianth-tube short, lobes 6, oblong or obovate, ciliate, silky within, 2 mm. long, those of ♂ and ♀ flowers similar. *Stamens* of ♂ flowers 9 (occasionally up to 12), those of the first two rows eglandular with quadrate anthers and slender filaments sparsely villous as is the connective, 3 mm. long; those of the third row rather shorter, also with quadrate anthers and a pair of large sessile or subsessile reniform glands attached near the bases of the filaments; anther-

cells all introrse except the lower ones of inner row which are often lateral; rudimentary ovary conical, with slender style and small spreading stigma. *Staminodes* of ♀ flowers 9, those of the 1st and 2nd rows linear, villous, 1 mm. long, those of the 3rd row subulate, villous, with a pair of large semisagittate sessile glands above the base of the filaments. *Ovary* ovoid, glabrous, with short thick style and large peltate usually lobed stigma. *Fruit* small, globose, 5—6 mm. in diameter, seated on the very slightly enlarged flattened perianth-tube about 2 mm. broad; pedicel 5 mm. long; pericarp fleshy, glabrous, aromatic; cotyledons hemispherical. Hook. f. Fl. Br. Ind. V. 155; Koord. & Val. Bijdr. X. 142; Brandis Ind. Trees 535. *Tetranthera citrata*, Nees Syst. Laur. 560; Bl. Mus. Bot. Lugd.-Bat. I. 385; Miq. Fl. Ind. Bat. I. 958. *T. polyantha*, Wall. Cat. 2538; Nees in Wall. Pl. As. Rar. II. 67 and Syst. Laur. 545; Meissn. in DC. Prodr. XV. 1. 182 (excluding China as locality); Kurz For. Fl. II. 301.

PERAK: Thaiping Hills, 3000 ft., *Ridley* 11390! PAHANG: at Telom, *Ridley* 13780!.—DISTRIB. India (Eastern Himalaya, Assam, Khasia Hills, Manipur, usually above 5000 ft.), Upper Burma, Java (above 2000 ft.).

It is very difficult in poor specimens to distinguish this from *Lindera pipericarpa*.

14. *LITSEA PETIOLATA*, Hook. f. in Fl. Br. Ind. V. 171 (1886). A very large evergreen tree reaching to 30 or even 45 m. in height and to more than 1 m. in diameter of stem; branchlets moderately stout, grey-brown when dry, uppermost and innovations glabrous except the minutely puberulous grey ovate-lanceolate buds. *Leaves* chartaceous, alternate; elliptic or elliptic-oblong or -lanceolate, obtuse or obtusely acute or sometimes acuminate at apex, cuneate sometimes unequally at base; upper surface bright green with yellow ribs when fresh, dull or shining reddish-brown when dry, glabrous, lower also glabrous, paler reddish-brown; 7—15 cm. long, 3—8 cm. broad; midrib impressed above; main nerves 5—8 pairs, slender, impressed above, curving to the margin; transverse nervules many, sub-parallel, not prominent; reticulation areolate; petiole slender, 1.5—2 cm. long. *Flowers* in umbellules on slender peduncles 5 to 10 mm. long in ♂, shorter and stouter in ♀, in rather dense lateral puberulous bracteate racemes usually 5—7 mm. long, forming clusters of up to 12; umbellules about 8 mm. in diam. in ♂, 5 mm.

in ♀ ; involucre bracts 5, glabrous or only minutely pubescent, thin, orbicular, concave, reflexed ; flowers in each umbellule 5—7, pedicels stout, pubescent ; perianth-tube short, lobes 6, linear-oblong, membranous, ciliate and laxly villous, 3 mm. long. *Stamens* in ♂ flowers 9, those of the outer 2 rows 5—7 mm. long with oblong anthers and filiform villous filaments, those of the inner row rather shorter with smaller anthers and a pair of small reniform stipitate glands at the base ; rudimentary ovary very small with long villous style and capitate stigma. *Staminodes* in ♀ flowers normally 9, those of the 2 outer rows subulate clavate 2—2.5 mm. long with hispid filaments, those of the 3rd row short clavate glabrous with a pair of large reniform shortly stipitate glands. *Ovary* globose, glabrous ; style thick, 3 mm. long ; stigma large, discoid. *Fruit* nearly globose, 6—7 mm. in diameter, seated on the very slightly enlarged flattened perianth-tube, about 3 mm. in diam., the margins sinuate somewhat reflexed ; pedicel stout, clavate, 5—7 mm. long ; pericarp smooth, rugose when dry.

PERAK : in open jungle on low hills up to 250 m. alt., *King's Collector* 430 !, 4460 !, 7759 !, 7761 ! ; *Scortechini* !. SELANGOR : at Kwala Lumpur, *Ridley's Collector* 4699 !. MALACCA : *Maingay K.D.* 1265 ! SINGAPORE : in Garden, Garden jungle, etc., *Ridley* 56 !, 3368 !, 6821 !, 10640 !, 10838 !, 11337 !, 11839 ! ; at Galang, *Baker* 3033 !. Vern. 'Poko Parawas'.

15. *LITSEA BRACHYSTACHYA*, Boerl. Handl. Fl. Ned. Ind. III. 143 (1900). A spreading evergreen tree reaching a height of 15—18 m. and up to 90 cm. in diam. of stem ; branchlets rather slender, smooth, nearly black when dry, angled, channelled decurrently from below the bases of the nodes, uppermost and innovations minutely grey-puberulous. *Leaves* chartaceous or subcoriaceous, alternate, glabrous ; elliptic or elliptic-ovate, obtusely acuminate at apex, acute or rounded often unequally at base ; upper surface shining, bright green when fresh, dark brown when dry, lower bluish green when fresh, brown when dry ; margins slightly recurved ; 10—14 cm. long, 5—7 cm. broad ; midrib slender, impressed above, prominently raised beneath ; main nerves 7—9 pairs, rather irregular, impressed above, at from 50° to 60° or sometimes 70° with the midrib, curved to join the margin ; transverse nervules rather distant and not prominent, straight or curved, enclosing the netted and rather obscure reticulation ; petiole slender, 15—25 mm. long, channelled above. *Flowers* in umbellules or slender peduncles up to 6 or even 10 mm.

long in panicles of racemes reaching to 4 sometimes to 10 cm. in length; rhachis angled, black when dry, minutely puberulous or glabrescent; raceme bracts minute, grey-puberulous, caducous; umbellules when open 5 mm. in diam.; involucre bracts 4—5, glabrous, reflexed in flower, the outer orbicular, the inner ovate or oblong; flowers in each umbellule 5—6, very small, on short villous pedicels; perianth-tube glabrous within except for tufts of long hair at the mouth; lobes 6 or fewer, some occasionally wanting, some merely linear, normally lanceolate, acuminate, villous on the back, 1—1.5 mm. long, those in ♀ flowers early deciduous in a ring. *Stamens* of ♂ flowers usually 9, the 6 of the outer rows 2 mm. long with subquadrate anthers and slender filaments long pilose at the base, the 3 of the inner row shorter and with a pair of shortly stipitate reniform glands near the bases of the filaments; rudimentary ovary 0. *Staminodes* of ♀ flowers 9, those of the outer rows 6 clavate, the filaments long-pilose, those of the inner row 3 subulate with a pair of large nearly sessile glands at their middle. *Ovary* globose, glabrous; style short; stigma large, peltate, lobed. *Fruit* globose or slightly ellipsoid, 8 mm. long, 7 mm. in diam., seated on the slightly enlarged obconic perianth-tube 3 mm. in diam.; enlarged pedicel 5 mm. long; pericarp thin, smooth; cotyledons hemispheric. Koord. & Val. Bijdr. X. 156. *Tetranthera brachystachya*, Bl. Mus. Bot. Lugd.-Bat. i. 384 (1851); Meissn. l. c. 196. *T. lucida*, Hassk. Cat. Hort. Bogor. 90 (1844) and Pl. Jav. Rar. 216; Miq. Fl. Ind. Bat. I. 1, 956 *excl. syn.*; Meissn. in DC. Prodr. XV. 1, 197.

PERAK: at Matang Jambu, etc., Wray 2518! 2886!; forests of Larut and Ulu Buvong at 120—200 m. alt., King's Collector 6855, 10528!—DISTRIB. Java.

The description of the fruit is taken from Buitenzorg specimens. Koord. and Val. consider that Wight's t. 1836 is probably intended to represent this species, but a comparison of the specimen of Wight's in Herb. Kew does not bear out this suggestion. Wight's t. 1836 probably represents *L. glabrata*, Wall. *Litsea lucida*, Bl. Bijdr. 961, is a *Lindera*.

16. *LITSEA ANGULATA*, Blume Bijdr. 563 (1825). An evergreen tree reaching 12—17 m. in height and 40—50 cm. in diam. of stem; branchlets moderately stout, grey, blackish-scurfy and lenticellate, uppermost angular, nearly black when dry, minutely puberulous; leaf buds lanceolate, grey-puberulous. *Leaves* coriaceous, alternate; elliptic or elliptic-oblong or -obovate, obtusely acute or acuminate at apex, attenuate or cuneate at base; upper surface olive-brown, shining,

glabrous; lower dark reddish brown, minutely but sparsely puberulous when young, afterwards glabrous; 10—20 cm. long, 4—6 cm. broad; midrib thick, impressed and sometimes keeled above, raised beneath; main nerves prominent, 7—12 pairs, usually 10, regular, parallel, impressed above, bisulcate beneath, leaving the midrib at from 65° — 70° and curving rather obliquely to the margin where they end; transverse nervules obscure, very slender, numerous and nearly straight, sometimes branched, enclosing the very minute obscure reticulation; petiole stout, 10—25 mm. long, black. *Flowers* in umbellules on slender grey-pubescent peduncles 5—7 mm. long, in axillary or lateral short pubescent racemes reaching (buds only) 1 cm. in length with about 6 flowers; involucre bracts 5, the 2 outer coriaceous, glabrous, orbicular, concave, the rest membranous and ovate, the innermost fimbriate and puberulous without; flowers in each umbellule 6, subsessile; perianth lobes 6—8, irregular in shape, sometimes alternately ovate-acute and oblong-obtuse, densely golden-villous without. *Stamens* in ♂ flowers (from bud only) 12—16, usually 12, glabrous, those of inner rows with a pair of large angular glands near the bases of the filaments. *Staminodes* of ♀ flowers 9, the 3 inner short and furnished with large quite adnate glands (Koorders & Valeton). *Fruit* glossy, dark red, ovate-oblong, 2 cm. long, 1 cm. in diam., the tip obtusely acute, seated on the flattened enlarged perianth-tube with undulate margins 6 mm. in diam.; enlarged pedicel clavate, flattened, 14—17 mm. long; pericarp when fresh speckled with white, the tip green (Kunstler) when dry nearly black. Koord. & Val. Bijdr. X. 158. *L. Reinwardtii*, Bl. M.S. fide Meissn. *Tetranthera angulata*, Nees Syst. Laur. 544; Blume Mus. Bot. Lugd.-Bat. I. 384; Miq. Fl. Ind. Bat. I. 1. 956; Meissn. in DC. Prodr. XV. 1. 197. *T. pseudo-angulata*, Bl. p. c. I. 385.

PERAK: on low ground at Larut, *King's Collector* 5350!, 6683!.
 SELANGOR: at Gua Batu, *Ridley* 8505!—DISTRIB. Java.

I believe the identification to be correct: unfortunately there are only leaf specimens available for comparison in the Kew and Calcutta Herbaria. Koorders and Valeton describe the drupes as depressed-globose.

17. LITSEA SPATHACEA, Gamble in Kew Bull. 358 (1910). A shrub or small shrubby tree scarcely reaching 6 m. in height and 5—8 cm. diam. of stem; branchlets rather stout, pale brown, sulcate or striate, lenticellate, innovations puberulous; buds lanceolate, leafy. *Leaves* submembranous, alternate, very variable; elliptic-oblong or

-oblanceolate or -obovate, rounded or acute or acuminate sometimes even cuspidate at apex, cuneate or attenuate at base; upper surface dull, olive-green, glabrous, lower glaucous or bluish-green, rarely reddish, also glabrous; 8—24 cm. long, 5—10 cm. broad; midrib pale, slender, impressed above, prominent beneath; main nerves 9 to 12, pale, curving upwards to join in loops near the margin; transverse nervules few but nearly straight and prominent, shining, conspicuous on the under surface, the smaller reticulations very evident on the upper surface when dry; petiole 5—20 mm. long, bordered above by the decurrent margins of the blade. *Flowers* in sessile or very shortly peduncled umbellules in very short few- (1—3-) flowered long-bracteate racemes axillary or lateral; bracts subulate, 3—5 mm. long; umbellules with 6 ovate-orbicular concave involucre bracts, the inner 3 smaller than the 3 outer, densely tomentose without, glabrous within, 5—7 mm. long, ♂ and ♀ nearly equal in size; flowers in each umbellule usually 6; perianth-tube short (1—1.5 mm.) in ♂, longer (3 mm.) in ♀; lobes 6, ovate, acute in ♂, oblong in ♀, ciliate, 1-nerved, 3 mm. long, glabrous or nearly so within. *Stamens* in ♂ flowers 9—12 in 4 rows, most (usually 6) of outer rows eglandular with 6 of inner rows shorter and biglandular, but often 3 only in inner row biglandular; outer rows 4 mm. long with small ovate acute anthers and very slender glabrous filaments, inner 2.5 mm. long with smaller anthers and shorter filaments and a pair of large sessile or shortly stipitate glands at their bases; rudimentary ovary ovate, very small with thick often bent style and peltate stigma. *Staminodes* of ♀ flowers as the stamens of the ♂ the outer ones clavate on capillary stalks 3 mm. long, the inner similar but 1—5 mm. long and with a pair of oblong glands at the base. *Ovary* ovoid with thick fleshy geniculate style and peltate slightly lobed stigma. *Fruit* ovoid, apiculate, 12—15 mm. long, 8—10 mm. broad, seated on the enlarged persistent but thin chartaceous perianth-tube which is 12 mm. in diam. bearing the persistent perianth lobes and often cleft in 2—5 segments; pericarp thin, glabrous; cotyledons semi-ovoid, fleshy.

PERAK: at Relan Tujur, Sungie Larut and Maxwell's hill, *Wray* 2198!, 2286!, 2755!; at Maxwell's hill, *Scortechini* 1410!; among rocks, in dense forest and up to 1000 m. alt., *King's Collector* 3493!, 4971!, 5130!, 5280!; Maxwell's hill, *Ridley*! SELANGOR: at Kwala Lumpur, *Curtis* 2371!

Var. *tomentosa*, Gamble. *Leaves* more obovate, rusty-pubescent beneath as are the upper branchlets and buds.

PERAK: *Scortechini* 1289!

18. *LITSEA MAGNIFICA*, Gamble. A small tree, bark smooth, pale, thin; branchlets moderately stout, pale brown, uppermost angular rusty-pubescent; buds lanceolate, hardly perulate. *Leaves* pergarmaceous, more or less crowded towards the ends of the branchlets; oblanceolate, rounded and very shortly acuminate at apex, very long and narrowly-cuneate at base; upper surface dull, olive-green when dry, glabrous except the midrib; lower surface paler, minutely grey-puberulous or glabrous except on the nerves; 23—43 cm. long, 6—10 cm. broad; midrib stout, flat or impressed above, very prominent beneath; main nerves 15 to 20 at about 50° with the midrib, slightly curved to the margin, impressed above, raised beneath; secondary nerves few and short; transverse nervules irregular and obscure; reticulation obscurely netted; petiole stout, 1 cm. long, sometimes 0. *Flowers* in long- (about 2 cm.) peduncled umbellules in very short thick woody racemes each bearing about 12 and about 7 mm. long, the racemes forming globose clusters 7—8 cm. broad on thick branches below the leaves; umbellules with 6 orbicular concave involucre bracts, densely grey-pubescent without, glabrous within, ♂ umbellules about 2 cm. in diam. when open, ♀ much smaller; flowers in each umbellule 7—9 in ♂, about 5 in ♀; perianth-tube funnel-shaped, 2—3 mm. long; perianth-lobes usually 6, oblong, ciliate, glandular, 3-nerved, 5—6 mm. long in ♂, 4 in ♀. *Stamens* of ♂ flowers 9 to 12, usually 12 in 4 rows, those of the two outer rows 7—9 mm. long, the filaments very slender and villous, the anthers 3·5—4 mm. long, acuminate, the upper cells oblong introrse, the lower overlapping the upper and lateral; those of the two inner rows 5—6 mm. long, similar but with the anthers shorter, and bearing at the base of the filaments a pair of stout pyriform sessile or subsessile glands under 1 mm. long; rudimentary ovary ovoid with long (4—5 mm.) style and spreading 2—3-fid stigma. *Staminodes* of ♀ flowers usually 12, sometimes more and rather variable, those of the 2 outer rows linear-subulate, 4—5 mm. long, slightly villous near the base, those of the 2 inner rows shorter and rather stouter 3—4 mm. long and bearing a pair of stout basal glands as in the ♂. *Ovary* ovoid; style 7 mm. long, gradually expanding upwards; stigma peltate, lobed, 2·5 mm. in diam. at top. *Fruit* (unripe) ovoid, subtruncate, apiculate, 10 mm. long, 7 mm. broad, seated on

the cup-shaped enlarged perianth-tube, smooth on the margins or with the remains of the perianth-lobes and staminodes, pubescent without, 5 mm. high and 8 mm. in diam.; pericarp thin, smooth, dotted. *Lepidadenia magnifica*, Miq. Fl. Ind. Bat. I. 936. *Cylindropodaphne magnifica*, Meissn. in DC. Prodr. XV. 1. 203.

PENANG: Waterfall gardens, *Ridley* 10770!. MALACCA: at Nyalas, *Derry* 1017!. (Vern. 'Madang Telon'); *Ridley's Collector* 448! (Vern. 'Madang Kuraing').—DISTRIB. Sumatra (*Teysmann* 1011 from Batang baroes, west coast!).

Teysmann's specimen in Herb. Calc. has leaves only but all the specimens enumerated agree with it.

Var. *pahangensis*, Gamble. Leaves larger, up to 12 cm. broad, more coriaceous, shining above reddish beneath when dry; main nerves less oblique, at about 70° with the midrib, deeply impressed, up to 25; petiole up to 2 cm. long, very stout.

PAHANG: at Pulau Chenkel and Kwala Tenok, *Ridley* 2271! etc., (Vern. 'Thadang Kunyit').

The ♂ flowers of this variety exactly agree with those of *Derry* 1017. The ♀ flowers have been used in the description of the species.

19. *LITSEA RIDLEYI*, Gamble in Kew Bull. 317 (1910). A tree; branchlets moderately stout, dark brown, uppermost minutely rusty-puberulous as are the lanceolate buds and the inflorescence. Leaves chartaceous, alternate; elliptic-oblong or -lanceolate, obtuse or acute or acuminate, often mucronate at apex, long attenuate at base; upper surface smooth, shining, glabrous except the rusty-puberulous midrib, minutely areolate-reticulate; lower paler or even subglaucous, younger slightly puberulous, later glabrescent, the nerves pubescent; margins recurved; 10—25 cm. long, 4—8 cm. broad; midrib slender, scarcely raised above, prominent beneath; main nerves 7—10 pairs, often irregular or branched, impressed above, raised beneath, starting at about 50° with the midrib and curving upwards to and along the margin, the uppermost 2—3 pairs nearly rejoining the midrib at its apex; transverse nervules very irregular, prominent, enclosing a faint areolate reticulation; petiole stout, flattened above, slightly rugose, nearly black, 1.5—2.5 cm. long. Flowers in short (up to 12 mm.) slender-peduncled umbellules in very short axillary or lateral racemes of 6—12, the racemes densely rusty-villous about 5 mm. long; umbellules 8—10 mm. broad when open; involucre bracts 4, ovate-oblong, concave, 4 mm. long; flowers in

each umbellule 4—6; perianth-tube short, lobes 6, oblong, villous, 2—3 mm. long. *Stamens* in ♂ flowers usually 9 (sometimes but less often up to 12), those of the outer rows 3 mm. long with sub-quadrate anthers and slender villous filaments, those of the inner rows shorter and with a pair of subsessile glands attached a little above the bases of the filaments; rudimentary ovary conical, with slender style and bifid stigma. *Staminodes* of ♀ flowers usually 12 (sometimes 9), those of the outer rows clavate with villous filaments 1—2 mm. long, those of the inner rows shorter and with a pair of rather large glands a little above the base. *Ovary* ovoid, glabrous; style curved; stigma subcapitate, bifid. *Fruit* nearly globose, 15 mm. in diam., seated on the enlarged, at first nearly closed, later hemispheric, at length obconical rugose perianth-tube about 6 mm. high, 8—10 mm. in diam. at the crenulate mouth and bearing the remains of the lobes and staminodes; pedicel short, slightly enlarged only; pericarp smooth, somewhat shining and wrinkled when dry.

SINGAPORE: at Changi, *Ridley* 3803!; at Reservoir Road, *Ridley* 5101!; at Bukit Mandai, *Ridley* 3836!, 4701!, 5064!, 5852!, 10833!; at Holland Road, *Hullett*; at plant house, *Cantley* 193!

This species is not unlike *L. Wallichii*, Hook. f., but differs in being pubescent and having leaves not prominently areolate-reticulate.

20. *LITSEA PENANGIANA*, Hook. f. in Fl. Br. Ind. V. 171 (1886). A small evergreen tree, reaching 7—9 metres in height and 15 cm. diameter of stem; branchlets pale brown densely softly rusty-tomentose as are the innovations, petioles and inflorescence; buds ovoid. *Leaves* coriaceous, alternate; elliptic-oblong, obtuse or shortly acute at apex, cuneate at base; upper surface dark-green when fresh, olive-brown when dry, glabrous, somewhat shining; lower pale bluish-grey when fresh, cinnamomeous when dry, at first minutely soft tomentose especially on the nerves, afterwards glabrous; 10—22 cm. long, 4—7 cm. broad; midrib stout, slightly channelled above; main nerves 8—10 pairs curving upwards to and along the margin, transverse nervules and reticulation faint on lower, minutely areolate on upper surface; petiole stout, 1—2.5 cm. long. *Flowers* in sessile or very shortly (up to 5 mm.) peduncled umbellules in very short small racemose axillary or lateral clusters of 3—4; involucre bracts 4, densely tomentose, ovate, concave; flowers in each umbellule 4—6; pedicels very short or 0; perianth-tube stout, 2 mm. long, villous within; lobes 6, oblong, obtuse, ciliate, glabrous within, tawny-villous without, 2—3 mm. long, erect or

spreading in ♂, more spreading in ♀. *Stamens* of ♂ flowers 12, in 4 rows, those of the outer row longest, 3 mm. long, eglandular, those of the 2nd 2.5 mm. long eglandular, those of the 3rd and 4th 2—2.5 mm. long with a pair of large reniform stipitate glands near the base; anthers ovoid, filaments of outer rows villous, of inner nearly glabrous, cells of 4th row anthers sometimes 2 only, all introrse; rudimentary ovary slender with slender style and bifid stigma. *Staminodes* of ♀ flowers 12, those of 2 outer rows slenderly clavate, 2 mm. long with villous filaments, those of inner rows similar but shorter and with a pair of large stipitate glands near the base. *Ovary* ovoid; style thick, curved; stigma peltate, bifid. *Fruit* ellipsoid, apiculate, 8—12 mm. long, 7—8 mm. broad, seated on a thick cup formed by the enlarged perianth-tube, cup at first nearly enclosing the fruit, afterwards hemispheric 10 mm. in diameter, the outside rugose, the margin crenulate with remains of the perianth-lobes and staminodes; enlarged pedicel very short, thick; pericarp shining, yellowish when dry.

PENANG: *Phillips*; on Government Hill, *Maingay* K.D. 1258/2!; at Moniots' road, 600 m. alt., *Curtis* 1587!, 2159!; at 550 m., *King's Collector* 1580!. PERAK: at lower camp, Gunong Batu Pateh, *Wray* 921!, 969!, 1081!, 1188!; *Scortechini* 369!; at 300 to 600 m. alt., *King's Collector* 8067!

The leaves and fruit of this species resemble those of *L. Griffithii*, but the leaves are alternate and not opposite and the flowers are different. Were it not for the remarks made by Sir Jos. Hooker in the Fl. Br. Ind. I should have been disposed to refer this species to *Tetranthera accedens*, Blume.

21. LITSEA CASTANEA, Hook. f. in Fl. Br. Ind. V. 171 (1886). A large tree reaching 30 or 40 m. in height and a great girth of stem; branchlets rather stout, dark grey-brown, hoary, lenticellate, uppermost minutely greyish-tawny-puberulous as are the linear lanceolate buds the petioles and inflorescence. *Leaves* chartaceous, alternate; elliptic, elliptic-ovate or -obovate, sometimes nearly orbicular, obtuse or emarginate at apex, rounded sometimes unequally at base; upper surface dark green when fresh, shining and dark reddish-brown when dry, lower paler and redder, both glabrous except the nerves, sometimes puberulous beneath and areolate reticulate; margins recurved; 7—22 cm. long, 5—10 cm. broad; midrib stout, deeply impressed above, much raised beneath; main nerves 8—16 pairs, deeply impressed above, at an angle of about 60° with the midrib at first nearly straight then curved to near the

margin where they, at any rate the upper ones, meet in loops strongly marked beneath; transverse nervules many, prominent, slightly arched; reticulation minutely netted; petiole fairly stout, 1—2.5 cm. long, channelled above. *Flowers* in umbellules on rather stout peduncles 8—12 cm. long in short axillary or lateral 6—8 mm. long racemes of about 6—8 each; raceme bracts ovate deciduous; umbellules when open 10—12 mm. broad (σ only); involucre bracts 4.5, ovate or ovate-orbicular, concave, white-tomentose, reflexed in flower; flowers in each umbellule 4—6; perianth-tube 3 mm. long, lobes 6—8, spreading or reflexed, variable but usually oblong-spathulate, densely villous without, glabrous within, 5 mm. long. *Stamens* in σ flowers 12—16, normally 12, those of outer rows 6—8 mm. long with ovate anthers and very slender sparsely villous filaments, those of inner rows shorter with subquadrate anthers and a pair of round long stipitate glands at about one-third of the length of the filaments; rudimentary ovary 0. *Staminodes* in φ flowers (bud only) 9—15, those of the outer rows clavate with villous filaments, those of the inner rows subulate-clavate with a pair of reniform stipitate glands near the base. *Ovary* globose, included in the speedily circumsciss perianth-tube; style thick, curved, glabrous; stigma large, conical. *Fruit* ovoid, to cylindric-ovoid 12 to 20 mm. long, 8 to 10 mm. broad, the base enclosed in the hemispheric cup-shaped enlarged perianth-tube 7—8 mm. high and 12 mm. in diam. at the circular mouth, the outside slightly rough, slightly puberulous; pedicel rather slender, slightly flattened, 10 mm. long; pericarp smooth, shining, yellowish-brown when dry.

PERAK: at Sungie Larut and Kota, *Wray* 2353!, 2867!, 3119!; in mixed forest about Larut up to 450 m. alt., *King's Collector* 3296!, 3509!, 4937!, 6497!, 10283!, 10926! SELANGOR: at Kwala Lumpur, *Ridley's Collector*!; *Burn-Murdoch* (*Ridley* 13204!) MALACCA: *Maingay* K.D. 1239!; at Bukit Bruang, *Goodenough* 1422!; at Brisu, *Derry* 1047!.

22. *LITSEA QUERCINA*, Gamble in Kew Bull. 318 (1910). A tree; branchlets greyish-brown, rather slender, uppermost grey-pubescent as are the innovations and the petioles and midrib of the leaves. *Leaves* coriaceous, alternate, areolate-reticulate; elliptic or elliptic-ovate, obtuse and mucronate sometimes emarginate at apex, rounded at base; both surfaces dark greyish-brown when dry, upper shining, glabrous except on the nerves, lower minutely puberulous

to nearly glabrous; 6—8 cm. long, 3—3·5 cm. broad; midrib slender but prominent, pubescent, deeply impressed above; main nerves 7—9 pairs, impressed above, starting at about 70° with the midrib and curved to near the margin; transverse nervules faint; areolate reticulation prominent on both surfaces under the lens; petiole 8—10 mm. long, rather slender. *Flowers* in umbellules on peduncles 6—8 mm. long on very short lateral racemes. *Fruit* ellipsoid-oblong, 2 cm. long, 1 cm. in diam., seated on the cup-shaped enlarged perianth-tube, the cup black when dry, dull, 7 mm. high, 9 m. in diam. at the sharp circular margin; enlarged pedicel very stout, 4 mm. long; pericarp smooth, shining, yellowish and wrinkled when dry.

PERAK: at lower camp, Gunong Batu Pateh, *Wray* 1174!

Very near *L. castanea*, but has much smaller thicker leaves, not red when dry, and with fewer main nerves.

23. *LITSEA CYLINDROCARPA*, Gamble in Kew Bull. 318 (1910). A spreading evergreen tree reaching 30 or 40 m. in height with a diam. of 90—120 cm. of stem; branchlets moderately stout, greyish, smooth, uppermost angular, minutely grey-puberulous as are the lanceolate buds and the inflorescence. *Leaves* coriaceous, alternate; elliptic or elliptic-oblong or -obovate, obtusely acute or rounded and very shortly apiculate or simply mucronate at apex, cuneate or attenuate at base; dark green and shining above when fresh, dull and brown and glabrous when dry except the prominently impressed midrib and main nerves, pale brown to glaucous and very minutely puberulous beneath; margins recurved; 9—18 cm. long, 4—9 cm. broad; midrib slender; main nerves 6—12 pairs, prominent, parallel, deeply impressed, starting at about 70° with the midrib and only slightly curving till close to the margin; transverse nervules many, straight, parallel but often hardly visible; reticulation not visible; petiole 10—25 mm. long, channelled and puberulous above. *Flowers* in rather long- (up to 1 cm.) pedunculate umbellules in axillary or lateral grey-pubescent racemes or clusters of racemes about 15—17 mm. long; raceme bracts ovate, acute, deciduous; involucre bracts ovate-orbicular, 4—5 mm. long, concave, glabrous within, at length spreading; flowers in each umbellule 5; pedicels short, tawny-villous; perianth-lobes oblong acute, very membranous, villous, 2—3 mm. long. *Stamens* of ♂ flowers very variable, 8—13, normally 9, those of the outer rows up to 5 mm. long with ovate anthers and slender villous filaments, sometimes with 1 or 2 glands

at the base; those of the inner rows shorter and biglandular, the glands rather small; rudimentary ovary rounded, villous; style slender; stigma oblique. *Staminodes* of ♀ flowers not known. *Fruit* cylindric-oblong, 2 cm. long, 7—9 mm. broad, obtuse at apex, seated on the cup-shaped rugose puberulous enlarged perianth-tube 5 mm. high, 7 mm. broad at the mouth; pedicel thick, flattened, 5 mm. long; pericarp red when ripe, rugose when dry; cotyledons oblong, base acute.

PENANG: at Batu Etam, 500 m., *Curtis* 787!. PROVINCE WELLESLEY: at Nibong Tibal, *Curtis* 3473!; at Krian, *Ridley* 9388!. PERAK: in dense jungle on low ground up to 30 m. alt., *King's Collector* 5500!, 5568!, 6207!, 6673!; at Bruas, *Burn-Murdoch* 211.—DISTRIB. Java, Borneo (base of Matang, *Ridley* 11673!; near Kuching, *Haviland* 3297!).

24. *LITSEA WRAYI*, Gamble in Kew Bull. 319 (1910). An ever-green tree reaching 20—25 m. in height and up to 60 cm. in diameter of stem; branchlets slender, greyish-brown, uppermost darker, angled, slightly puberulous; leaf-buds lanceolate, grey-puberulous. *Leaves* chartaceous, alternate-elliptic; oblong, or oblong-lanceolate or -oblanceolate, acuminate at apex, long attenuate at base or more rarely acute; upper surface smooth, shining, glabrous, dark-brown, lower paler and reddish, glabrous or the youngest very slightly puberulous; margins slightly recurved, thickened; 10—17 cm. long, 3—5 cm. broad; midrib slender, slightly impressed above, raised beneath; main nerves 10—13 pairs, hardly impressed above, leaving the midrib at about 60° and curving at once obliquely upwards to and along the margin, the upper ones joining in loops; transverse nervules slender, irregular, often branched, enclosing the areolate reticulation; petiole slender, 15—25 mm. long, the upper half bordered by the decurrent margins of the blade. *Flowers* (buds only) in umbellules on slender villous or sub-glabrous peduncles 4—6 mm. long, single or fascicled or in very short (5 mm.) puberulous racemes, axillary or lateral on the upper branchlets; raceme bracts ovate, grey-puberulous, caducous; involucre bracts 4—5, villous without, glabrous within, the fifth when present obovate, the rest orbicular concave; flowers in each umbellule 5—6; perianth-lobes 6, villous without, oblong, obtuse or acute usually alternately. *Stamens* in ♂ flowers 12, glabrous, those of the outer rows with acute anthers, those of the inner rows obtuse and with a pair of sessile glands halfway up the filaments; rudi-

mentary ovary ovate with short style and cleft stigma. *Staminodes* of ♀ flowers also 12, glabrous, those of the outer rows clavate, those of the inner rows subulate with a pair of large sessile glands above the base. *Ovary* ovoid; style thick, curved; stigma capitate. *Fruit* globose with slightly conical blunt apex, 10 mm. in diam. seated on the enlarged spotted perianth-tube; cupule when young nearly globose enclosing the fruit with only a very small orifice, at length obconical enclosing only the lower half of the fruit, 8 mm. high and 12 mm. in diameter at the mouth, margin smooth; enlarged pedicel thick, slightly flattened, 4 mm. long; pericarp waxy white when fresh, yellowish when dry.

PERAK: at Waterfall Hill, *Wray* 1853!, 4036!; *Scortechini*!; in hill forests near Larut at 250—450 m. alt., *King's Collector* 6908!, 7569!.

25. *LITSEA SINGAPORENSIS*, Gamble in Kew Bull. 358 (1910). A tree (?), branchlets moderately stout, pale brown, glabrous; buds lanceolate, pubescent. *Leaves* coriaceous, alternate; oblong-lanceolate or -oblanceolate, obtuse or obtusely acute at apex, long-cuneately narrowed at base; margins recurved; upper surface smooth, shining, areolately reticulate, glabrous, pale brown when dry, lower also smooth and glabrous and lighter in colour; 15—30 cm. long, 4—7 cm. broad; midrib stout, flat or slightly raised above, raised beneath; main nerves 6—12 pairs, obscure and slightly impressed above, prominent beneath and conspicuous, curved to and along the margin; transverse nervules faint; reticulation areolate, fairly prominent on upper surface; petiole stout, rugose, 1.5—2 cm. long. *Flowers* in puberulous pedunculate (up to 13 mm.) umbellules in axillary or lateral thick racemes of about 1—4 and 7 mm. long; involucrel bracts 4, thin, orbicular, concave; flowers in each umbellule 5, on thick short pedicels; perianth-tube short, lobes spatulate, rusty-villous without. *Stamens* in ♂ flowers 12, those of the two inner rows biglandular (buds only available); staminodes of ♀ flowers not seen. *Fruit* depressed globose, apiculate, 15 mm. in diam., seated on a shallow rather thin hemispheric cupule 7 mm. high, 16 mm. broad; cupule broadening with age, rugose or pustulate without, margin smooth; enlarged pedicel short, 6—7 mm. long, stout; pericarp smooth, pale yellowish or greenish when dry.

SINGAPORE: at Bukit Timah, Toas, in Garden jungle and

Botanic Garden, *Ridley* 2118!, 3372!, 3894!, 4135!, 4826!, 5965!, 5736!; at Tanglin, *Hullett* 5738!—DISTRIB. Borneo, Bongaya river, *Ridley* 9075!

26. *LITSEA PERAKENSIS*, Gamble in Kew Bull. 359 (1910). A tree reaching 20 or more metres in height and 50 cm. in diam. of stem; branchlets nearly black when dry, striate, glabrous. *Leaves* sub-coriaceous, alternate; oblong, oblong-obovate or -oblanceolate, obtuse acute or acuminate at apex, attenuate at base; dark green above when fresh, olive-brown and shining when dry, bluish green beneath when fresh, sub-glaucous when dry, glabrous on both surfaces; margins recurved; 15—30 cm. long, 5—8 cm. broad; midrib stout, reddish, scarcely raised above, prominent beneath; main nerves 10—12 pairs, somewhat irregularly parallel, starting at about 50° with the midrib and curved gradually to and along the margin, the upper few looped so as nearly to rejoin the midrib at its tip; transverse nervules few, faint as is the reticulation; petiole stout, 1.5—3 cm. long, glabrous. *Flowers* in slenderly-peduncled (8—10 mm. long) umbellules in short axillary lateral or sometimes sub-terminal glabrous or minutely puberulous racemes about 8 mm. long; raceme bracts lanceolate, acuminate; umbellules (♂ only) up to 10 mm. broad when open; involucre bracts 4, orbicular, concave, glabrous within, 3—4 mm. in diam.; flowers in each umbellule 5; pedicels 2—3 mm. long; perianth-lobes oblong, obtuse or acute, ciliate at the tips, 3 mm. long. *Stamens* of ♂ flowers 9—12, usually 12, those of the outer rows 5—6 mm. long with obovate anthers and slender filaments slightly villous at base, those of the inner rows shorter with smaller anthers and a pair of rounded shortly stipitate glands near the base; lower anther-cells all lateral; rudimentary ovary short, with thick glabrous style and capitate stigma. *Staminodes* of ♀ flowers not known. *Fruit* glossy with white spots when fresh, yellowish when dry, globose, 1 cm. in diam., apiculate, seated on the shallow cup-shaped enlarged perianth-tube 5 mm. high and 10 mm. in diam. at the mouth; the cup and its very thick somewhat flattened 8—10 mm. long pedicel roughly tubercular.

PERAK: at Larut and Goping up to 250 m. alt., *King's Collector* 5114!, 6069!, 6085!. JOHORE: at Sungei Telrang, *Ridley* 13233!. SINGAPORE: at Bukit Timah, *Ridley* 14135!.

Kunstler describes this as a magnificent and rare tree.

27. *LITSEA PUSTULATA*, Gamble in Kew Bull. 359 (1910) A small or moderate-sized evergreen tree reaching 12 to 18 m. in height and 25—37 cm. in diam. of stem; branchlets stout with large pith, pale brown, smooth, striate when dry, uppermost slightly puberulous. *Leaves* subcoriaceous, alternate; elliptic-oblong or slightly obovate, rounded and with a short acumen at apex, broadly attenuate to rounded at base; upper surface shining, glabrous, lower bluish-green or slate-coloured when fresh, subglaucous when dry; margins recurved; 18—35 cm. long, 8—14 cm. broad; midrib stout, flat above, raised beneath; main nerves 8—12 pairs, slightly impressed above, starting at from 50°—60° with the midrib and curving upwards to and along the margin, the uppermost nearly reaching the apex; transverse nervules many, faint, arched, enclosing the obscure areolate reticulation; petiole stout, 2—3 cm. long. *Flowers* in umbellules in short axillary or lateral racemes about 1 cm. long; rest not known. *Fruit* globose, slightly depressed, 15 mm. in diam., seated on the shallowly obconic patelliform enlarged very rugose spotted and pustulate perianth-tube, when young this is globose with a very small orifice and enclosing the fruit, later on it is hemispheric, finally patelliform 5—6 cm. long 12 cm. in diam., margin smooth; enlarged pedicel thick, also rugose and pustular, flattened, 8—12 mm. long; pericarp smooth, yellowish when dry.

PERAK: dense forests near Larut up to 250 m. alt., *King's Collector* 2544!, 3418!, 5140!.

28. *LITSEA PATELLARIS*, Gamble in Kew Bull. 360 (1910). A spreading evergreen tree reaching 12—18 m. in height and 20—30 cm. in diameter of stem; branchlets stout, smooth, brown, the uppermost puberulous; leaf-buds ovoid. *Leaves* sub-coriaceous, alternate; oblong or obovate, abruptly acuminate at apex, cuneate at base; upper surface smooth, shining, glabrous, lower bluish-green when fresh, grey-glaucous when dry, minutely puberulous when young afterwards glabrous; margins recurved; 20—40 cm. long, 7—14 cm. broad; midrib stout, plane above, much raised beneath; main nerves 8—10 pairs, slightly impressed above, prominent beneath, starting at about 50° with the midrib and passing obliquely with only a slight curve upwards to and along the margin where they end in small diminishing loops; transverse nervules many, arched, sometimes branching, enclosing the minutely netted reticulation; petiole stout, 2—3 cm. long. *Flowers* not known, but racemes axillary

very short. *Fruit* globose, slightly depressed, 10—12 mm. high, 15 mm. in diam., seated on the patelliform nearly flattened rugose enlarged perianth-tube 10—12 mm. in diam., margin smooth; pedicel rough, flattened, 7—8 mm. long with the cup; pericarp bright red when ripe, glossy, yellowish and wrinkled when dry.

PERAK: in dense forest at 150—250 m. alt. near Larut, *King's Collector* 7312!

29. *LITSEA FENESTRATA*, Gamble in Kew Bull. 360 (1910). A large evergreen tree reaching to 30 m. in height and a considerable girth of stem; branchlets very stout with pale brown bark, the uppermost angular and very minutely puberulous as are the lanceolate buds. *Leaves* pergamaceous, alternate; oblong or oblong-obovate, rounded or retuse at apex, attenuate or rounded and often unequal at base; upper surface more or less shining, pale olive-green; lower sub-glaucous; both glabrous except on the nerves beneath, areolate-reticulate; margins recurved, cartilaginous; 15—35 cm. long, 8—14 cm. broad; midrib very stout, nearly flat above, much raised beneath; main nerves 10—15 pairs, distant, slightly impressed above, raised beneath, starting at about 50°—60° with the midrib and curving to and along the margin; transverse nervules very irregular, branched, enclosing the areolate reticulation; petiole very stout, 1—2.5 cm. long, rugose. *Flowers* in umbellules on short (7 mm.) stout tawny-puberulous peduncles in thick dense clusters on the branches usually of 2-years' old wood; umbellules when open about 12 mm. in diam.; involucral bracts 4—5, orbicular or obovate, concave, tawny-puberulous without, glabrous within; flowers in each umbellule 6—7 on pedicels about 4 mm. long; perianth-lobes 6, linear-oblong, obtuse, villous without, glabrous within, 4—5 mm. long, recurved in flower. *Stamens* of ♂ flowers variable in number, normally 12, those of the outer rows about 6—7 mm. long with elliptic decurrent anthers, very slender slightly villous filaments and occasional glands at the base; those of the inner rows shorter and furnished a little way above the base of the filaments with a pair of oblong bifid stipitate glands, cells all introrse; rudimentary ovary 0. *Staminodes* of ♀ flowers not known. *Fruit* globose, 22 mm. in diam., at first completely enclosed in the turbinate, woody, truncate-pear-shaped, pale brown, furfuraceous, enlarged perianth tube, later on about 20 mm. long, the orifice circular, 10—12 mm. in diam., finally the orifice opening to nearly 25 mm., the fruit $\frac{1}{2}$ — $\frac{2}{3}$ exsert; enlarged pedicel very stout,

5 mm. long; pericarp very thick, waxy-white outside when fresh, later purple.

PERAK: in dense jungle near Larut up to 250 m. alt., *King's Collector* 5938!, 6859!.—DISTRIB. Sumatra at 450 m. alt., *Forbes* 3174!. Borneo, near Kuching, *Haviland* 3088 *probably*.

30. *LITSEA FOXIANA*, Gamble in Kew Bull. 361 (1910). A medium-sized tree; branchlets stout, rough, pale grey, uppermost angular, minutely rusty-pubescent as are the linear-lanceolate buds, the petioles and midribs of the leaves and the inflorescence. *Leaves* subcoriaceous, alternate; elliptic or elliptic-oblong or -obovate; long cuspidate-acuminate at apex, attenuate at base; dark brown and dull and glabrous except on the prominently impressed midrib and main nerves on the upper surface, glaucescent and minutely puberulous on the lower surface; margins recurved; 10—20 cm. long, 5—7 cm. broad; midrib stout, prominent; main nerves 12—16 pairs, parallel, prominent, the lowest pair marginal, at an angle of about 60° with the midrib and curving only near the margin, the upper 2 or 3 meeting in loops below the cusp; transverse nervules many, straight, regular, parallel but faint; reticulation obscure; petiole thick, 2—3 cm. long. *Flowers* in slenderly pedunculate (about 6 mm. long) umbellules in grey-pubescent axillary or lateral racemes up to 2 cm. long in ♂, 5 mm. in ♀, the racemes sometimes in fascicles of 2—3; raceme bracts very small, deciduous; involucre bracts 4, orbicular, concave, 4—5 mm. in diam.; open umbellules nearly 10 mm. in diam. in ♂, 8 mm. in ♀; flowers in each umbellule 5—6; pedicels short or almost 0; perianth-lobes oblong, obtuse or acute, villous, ciliate, ♂ 3 mm. ♀ 1.5—2 mm. long. *Stamens* of ♂ flowers variable in number, 8—10, normally 9, the outer rows 3—4 mm. long, with ovate anthers and slender villous filaments, those of inner rows shorter with a pair of rather small subsessile glands near the bases of the filaments; rudimentary ovary 0. *Staminodes* of ♀ flowers also very variable, but normally 9, those of outer rows clavate, 2—3 mm. long, with villous filaments, those of inner rows shorter, subulate, with a pair of rather large ovate glands a little above the base. *Ovary* globose, glabrous; style thick, curved; stigma large, lateral, long-bifid. *Fruit* not known.

PENANG: at Moniot's road, *Curtis* ♂ 2305! and ♀ without number!

31. *LITSEA MONTICOLA*, Gamble in Kew Bull. 361 (1910). A tree reaching 12—15 m. in height and 45—60 cm. in diam. of stem; branchlets stout with pale brown bark, sub-quadrangular, scurfy and nearly glabrous, the small terminal buds only minutely pubescent. *Leaves* coriaceous, alternate; elliptic or elliptic-oblong or -obovate, acute or acuminate and slightly mucronate at apex, attenuate at base; both surfaces glabrous, olive-brown when dry and somewhat reddish beneath; margins recurved; 10—20 cm. long 4—6 cm. broad; midrib prominent, impressed above; main nerves 8—12 pairs, subparallel, the lowest pair marginal, impressed above, raised beneath, at about 50° with the midrib, curving gently to the margin and a little parallel to it; transverse nervules straight, subparallel, obscure as is the areolate reticulation; petiole stout, black when dry, glabrous, channelled above, 15 mm. long. *Flowers* in umbellules on rather stout, 6—8 mm. long, glabrous peduncles, in thick angled puberulous up to 20 mm. long 8—10-flowered axillary or lateral racemes; involucral bracts 4, orbicular, glabrous except the ciliate margins of the 2 inner, 4—5 mm. in diam.; flowers in each umbellule 5, densely golden-tawny-villous; perianth-lobes 6, ovate-acute or -acuminate, densely villous without, glabrous within, gland-dotted. *Stamens* of ♂ flowers variable in number and arrangement, 8—13, but normally 9; those of outer rows 3 mm. long with oblong anthers and filaments densely villous with long hairs, those of inner rows shorter and with a pair of large ovate sessile glands near the base of the filaments; lower anther-cells lateral; rudimentary ovary 0. *Staminodes* of ♀ flowers and fruit not seen.

PERAK: on the top of Gunong Ejon at 1200—1400 m. alt., and near Thaiping 1000—1200 m., *King's Collector* 7000!, 8454!

This species comes rather near to *L. Foxiana*, but the leaves are not so long acuminate nor glaucous beneath nor pubescent, the racemes are short, the umbellules are glabrous instead of grey-pubescent, the flowers inside the involucral bracts are densely tawny villous, instead of being merely sparsely so, and the main nerves are more distant.

32. *LITSEA SCORTECHINII*, Gamble in Kew Bull. 362 (1910). A tree?; branchlets chestnut-brown, ferruginous-puberulous, somewhat angled; buds lanceolate, golden-pubescent, as in the inflorescence. *Leaves* chartaceous, alternate; lanceolate or elliptic-lanceolate, long and sharply acuminate at apex, long-attenuate at base; upper surface glabrous except on the nerves, minutely reticulate; lower

faintly ferruginous-pubescent, more strongly so on the nerves; 10—17 cm. long, 4—6 cm. broad; midrib slender but prominent, deeply impressed and puberulous above, raised beneath; main nerves 6—10 pairs, impressed above, the pairs sub-opposite, curved to and along the margin, the upper ones joining in loops; transverse nervules many but faint; joined by a minutely areolate reticulation; petiole slender, 1—2 cm. long. *Flowers* in umbellules on rather short (2—3 mm.) peduncles in very short (3—5 mm.) axillary or lateral racemes, the whole shorter than the petiole; involucre bracts 5, membranous, glabrous inside, the margins fimbriate, 4 usually orbicular and concave, 1 obovate; flowers in each umbellule 5; perianth-lobes oblong, densely golden-villous without. *Stamens* normally 9 with much villous hair at the base, the filaments slender, the anthers subquadrate obtuse, the 3 inner with a pair of sessile oblong glands about halfway up the filaments. *Staminodes* of ♀ flowers and fruit unknown.

PERAK: at Haram Parah, *Scortechini* 866!

33. *LITSEA OCHRACEA*, Boerl. Handl. Fl. Ned. Ind. 144 (1900). A tree with spreading branches reaching 15—20 m. in height and 60—90 cm. diam. of stem; branchlets rather stout, greyish brown, somewhat angled, uppermost darker, innovations minutely tawny-puberulous, as is the inflorescence; buds lanceolate. *Leaves* chartaceous, alternate; oblong-lanceolate or oblanceolate, shortly acuminate at apex, long-narrowed at base; upper surface dull, olive brown when dry, glabrous, lower ashy-glaucous, sometimes slightly puberulous especially along the nerves; 12—28 cm. long, 4—8 cm. broad; midrib stout, flattened above, raised beneath; main nerves 7—10 pairs starting at about 40°—50° with the midrib and curving upwards to and along the margin; transverse nervules many, more or less prominent beneath in a network of reticulation; petiole rather slender, glabrous, 12—20 mm. long. *Flowers* in very slenderly (10—12 mm. long) peduncled umbellules, corymbosely seated about 10—12 together on 8—15 mm. long axillary or lateral racemes (♀ shorter than ♂); umbellules of ♂ about 8—10 mm. broad when open, of ♀ smaller; involucre bracts 4, orbicular-ovate, concave, puberulous without; pedicels slender, about 1—5 mm. long; flowers, in each umbellule 6; perianth-tube in ♂ 1 mm. long, lobes ovate, ciliate, 2—5 mm. long. *Stamens* of ♂ flowers normally 12, those of the outer rows 2—5 mm. long with elliptic-oblong anthers and

slightly villous filaments, those of the inner rows shorter with a pair of ovate stipitate glands about halfway up the filaments; rudimentary ovary conical, glabrous. *Staminodes* of ♀ flowers (rather imperfect) 12, clavate, nearly glabrous, the inner ones with a pair of large glands somewhat above the base. *Ovary* ovoid, glabrous; style thick; stigma peltate. *Fruit* a globose berry half-enclosed in the cup-shaped tuberculate sulcate enlarged perianth-tube, 10 mm. broad at the mouth, 5 mm. high, the margin crenately lobed; enlarged peduncle thickened, 6 mm. long. *Cylicodaphne ochracea*, Blume Mus. Bot. Lugd.-Bat. II. 13; Meissn. in DC. Prodr. XV. 1. 205. *Lepidadenia ochracea*, Miq. Fl. Ind. Bat. I. i. 938.

PERAK: at Chanderiang and Goping, from about 100—250 m. alt., *King's Collector*, 5666!, 5959!; *Scortechini*?! —DISTRIB. Sumatra (*Korthals*).

34. *LITSEA OBLANCEOLATA*, Gamble in Kew Bull. 362 (1910). A small evergreen tree reaching about 10—12 m. in height and with a diameter of stem of 45 cm.; branchlets pale brown, slender, lenticellate, with raised vertical lines below the nodes and leaves; innovations and leafy buds rusty-puberulous as is the inflorescence. *Leaves* chartaceous, alternate; oblanceolate, obtuse at apex with a short abrupt acumen, long-cuneately-narrowed at base; both surfaces glabrous, dull, upper pale brown when dry, lower sub-glaucous; 10—23 cm. long, 3—6 cm. broad; midrib rather slender, slightly raised above, more so beneath; main nerves 8—10 pairs, impressed above, starting at an angle of about 40° with the midrib and at once curving obliquely to and along the margin; transverse nervules fairly regular and straight but obscure; reticulation scarcely visible; petiole slender, twisted, 10—15 mm. long, bordered above by the decurrent margins of the blade. *Flowers* in sessile umbellules on very short (at most 7 mm. long) axillary or lateral thick racemes; raceme bracts ovate, rusty tomentose; involucre bracts 4, orbicular, concave; flowers in each umbellule 4—5, on slender pedicels 2 mm. long; perianth-lobes spreading, ovate, obtuse, glabrous within, 2 mm. long. *Stamens* of ♂ flowers 9—12, slender, glabrous, those of the outer rows exsert, those of the inner rows shorter and with a pair of sessile oblong glands a little above the base of the filaments; rudimentary ovary very small, with slender style and small bifid stigma. *Staminodes* of ♀ flowers and *fruit* not known.

PERAK: chiefly in moist places near Larut up to 90 m. alt., *King's Collector* 1952!, 2020!

This species is distinguished from *L. ochracea* chiefly by the oblanceolate leaves, very much shorter racemes and sessile umbellules; but they are very close to each other.

35. *LITSEA KUNSTLERI*, Gamble in Kew Bull. 363 (1910). An evergreen tree reaching 18 m. in height and about 50 cm. in diam. of stem; branchlets stout, angular from raised lines decurrent from the leaves, dark grey or glaucous, glabrous; buds lanceolate. *Leaves* chartaceous, alternate; oblong or oblong-lanceolate, rounded or emarginate at apex, attenuate and somewhat rounded at base; when fresh dark green above, bluish-green beneath, when dry olive-brown above, sub-glaucous beneath, both surfaces glabrous, areolate-reticulate; 15—30 cm. long, 6—12 cm. broad; midrib rather slender, slightly channelled above, raised beneath; main nerves 12—14 pairs, slender, rather irregular, starting at from 50°—60° with the midrib and curved upwards to near the margin and along it, fading off in small loops, slightly impressed above; transverse nervules irregular, branched, enclosing the areolate reticulation; petiole stout, glabrous, channelled above, 1—2 cm. long. *Flowers* in grey-puberulous umbellules on slender 8 mm. long peduncles, fascicled in very short thick axillary or lateral racemes up to 10 mm. long and about 10 together; raceme bracts ovate, caducous; umbellules (♂) when open about 12 mm. broad; involucre bracts 4—6, usually 6, the outer orbicular, the inner obovate, glabrous within; flowers in each umbellule 7; pedicels 2 mm. long; perianth-tube funnel-shaped, lobes 6, variable, usually oblong or obovate, 3—4 mm. long, glabrous within, pubescent without, gland-dotted. *Stamens* of ♂ flowers 12, those of the outer rows eglandular, up to 4 mm. long with ovate anthers and slender slightly villous filaments, those of the inner rows shorter and with a pair of rather large reniform shortly stipitate glands near the base, lower anther-cells all lateral; rudimentary ovary very small with slender style. *Staminodes* of ♀ flowers and *fruit* not known.

PERAK: near Gunong Pondo and Gunong Bubu, up to 250 m. alt., *King's Collector* 7527!, 7670!

36. *LITSEA CLAVIFLORA*, Gamble in Kew Bull. 363 (1910). A tree, reaching 10—12 m. in height and 20—12 cm. in diam. of stem; branchlets slender, pale brown, glabrous except the uppermost shoots, innovations and inflorescence which are minutely puberulous. *Leaves* chartaceous, alternate; elliptic-lanceolate or -oblanceolate, shortly acuminate at apex, narrowed at base; upper surface olive-green

when dry, dull, lower glaucous; 10—18 cm. long, 4—8 cm. broad; midrib slender, impressed above, raised beneath; main nerves about 6 pairs, impressed above, starting at about 40° with the midrib and curved to and along the margin where they become looped; transverse nervules prominent, distant, joined again transversely in a network, prominent beneath; petiole rather slender, 8—10 mm. long. *Flowers* in rather long (1—2 cm.) -peduncled subglabrous umbellules 2—3 together in a very short raceme in the axils of the upper leaves or of fallen leaves; umbellules (♂ only) about 7 mm. broad when open; involucre bracts 4, orbicular, concave, 4 mm. broad; flowers 5 in each umbellule; perianth-tube short, villous within, lobes 6, oblong, obtuse, glabrous except at base within and outside, prominently gland-dotted, 2 mm. long. *Stamens* of ♂ flowers 12, those of the outer rows 3—4 mm. long with elliptic anthers and slender villous filaments, those of the inner rows shorter with oblong obtuse anthers and a pair of large sessile quadrate glands near the bases of the filaments; rudimentary ovary conical, glabrous. *Staminodes* of ♀ flowers and fruit unknown.

PERAK: near Thaiping in dense forest at 150—300 m. alt., *King's Collector* 8492!.

This species somewhat resembles *L. gemelliflora*, Boerl. (*Tetranthera gemelliflora*, Miq.); but that species has much thinner leaves and almost filiform peduncles, rarely more than two together on the extremely short rachis.

37. LITSEA HELFERI, Hook. f. in Fl. Br. Ind. V. 172 (1886).—
DISTRIB. Tenasserim (or Andaman Islands) *Helper*, K.D. 4307.

Var. *ovata*, Gamble. A tree; branchlets rather slender, dark brown, glabrous. *Leaves* subcoriaceous; ovate or elliptic, acuminate at apex, attenuate at base, upper surface olive-brown when dry, glabrous, lower glaucescent, glabrous except along the nerves; 5—11 cm. long, 3—6 cm. broad; midrib rather stout, main nerves 4—6 pairs curved to anastomose near the margin, slightly impressed above; transverse nervules prominent, joined by a prominent reticulation; petiole stout, 5—7 mm. long. *Flowers* in subglabrous umbellules on peduncles 5 mm. long, 1—3 together on extremely short tubercles in the axils of the leaves; involucre bracts reflexed in flower; flowers 4—5 in each umbellule. *Stamens* 12, the 6 of the 3rd and 4th rows biglandular, filaments glabrous; anthers subquadrate; rudimentary ovary ovoid; with a slender style. *Staminodes* of ♀ flowers and fruit not known.

PERAK : at Ulu Batang Padang, Wray 1600!

This may prove to be a distinct species when more and better specimens are obtainable.

38. *LITSEA MYRISTICÆFOLIA*, Hook. f. Fl. Br. Ind. V. 172 (1886).
An evergreen tree reaching 15 to 18 ft. in height and 30 to 40 cm. in diameter of stem; branchlets moderately stout, grey, the uppermost nearly black when dry; buds lanceolate, leafy; all parts quite glabrous. *Leaves* coriaceous, alternate; elliptic-oblong or lanceolate or obovate, obtuse or obtusely acute or acute at apex or sometimes retuse, cuneate or attenuate at base; upper surface bright green and glossy when fresh, olive brown and dull when dry, lower dull and subglaucous; margins recurved; 8—23 cm. long, 3—7 cm. broad; midrib deeply impressed above, raised prominently beneath; main nerves 6—12 pairs, immersed and faint, curved upwards to and along the margin, transverse nervules and reticulation not apparent; petiole stout, 1—2 cm. long, channelled above. *Flowers* glabrous, in long- (1—2 cm.) peduncled umbellules, single or in pairs or many (up to 12) together on short racemes axillary or lateral on the upper branchlets; umbellules when open up to 10 mm. broad in ♂, 7 mm. in ♀; involucral bracts 4—6, orbicular, concave, reflexed; flowers in each umbellule usually 6, shortly pedicelled; perianth-tube short, lobes 6, oblong, obtuse, obscurely toothed, 3—4 mm. long in ♂ shorter in ♀, gland-dotted. *Stamens* in ♂ flowers 9—12, those of the two outer rows about 3 mm. long with ovate anthers and slender filaments, eglandular or sometimes with 1—2 small glands; those of the two inner rows shorter with oblong anthers and a pair of large reniform stipitate glands above the bases of the filaments; rudimentary ovary in 9-stamened flowers ovoid with curved style and peltate stigma, in 12-stamened flowers 0. *Staminodes* in ♀ flowers 9 to 12, usually 12, the outer 2 rows oblong clavate 2.5 mm. long, the inner two rows similar but shorter and with a pair of large reniform glands at the base. *Ovary* ovoid; style thick, much curved; stigma large, peltate, 3-lobed. *Fruit* globose, 8 mm. in diameter, half-immersed in the cupular fleshy enlarged perianth-tube 1 cm. long, 8 mm. broad at mouth; enlarged pedicel clavate, nearly at right angles with the cupules and up to 2.5 cm. long when dry; pericarp smooth. Brandis Ind. Trees 538. *Tetranthera myristicæfolia*, Wall. Cat. 2548; Nees in Wall. Pl. As. Rar. II. 67, III. 31, and Syst. Laur. 555; Kurz For. Fl. II. 302 (excluding var. 2); Miq. Fl. Ind. Bat. I. 1. 957. *Cylicodaphne*

myristicæfolia, Meissn. in D.C. Prodr. XV. 1. 208. *C. oblonga*, var. γ *Griffithii*, Meissn. l.c. 205. *Lepidadenia Griffithii*, Wight Ic. t. 1846. *Diospyros* ? *acuminata*, Wall. Cat. 4129.

PENANG: *Wallich* 2548!; *Porter* (*Wallich* 4129); at Waterfall, etc., *Curtis* 769!, 1079!; on Penang Hill, *Ridley* 7071!; at 250—350 m. alt., *King's Collector* 5204!. MALACCA: *Griffith* K.D. 4282!; *Cumming* 2321!; *Maingay* K.D. 1254!, 1267!; at Kwala Linggi, etc., *Derry* 97!, 416!, 1008!; at Sungli Hudang, *Goodenough* 1681!, *Ridley* 1603!, *Holmberg* 690!; at Alor Gajah, *Ridley* 10026!. PAHANG: at Telom ridge, *Ridley* 13725!. SINGAPORE: *Ridley* 4824!, 5973!, 6096!, 13331!.—DISTRIB. Burma.

39. LITSEA TEYSMANNI, Gamble in Kew Bull. 319 (1910). An evergreen tree; branchlets rather stout with pale brown lenticellate bark, uppermost blackish, glabrous or slightly puberulous; leaf-buds lanceolate, grey-puberulous. *Leaves* coriaceous, alternate, glabrous; elliptic-oblong or -obovate, obtuse or abruptly cuspidate-acuminate at apex, acute at base and often unequal; upper surface shining, olive-brown, lower paler, reddish-grey, dull; margin slightly recurved; 10—17 cm. long, 4—6 cm. broad; midrib moderately stout, raised beneath; main nerves 8—12 pairs, slender, scarcely visible above, more so beneath, at an angle of 50° with the midrib, curving upwards to and along the margin, the upper ones meeting in loops; transverse nervules irregular, branched, enclosing the rather widely netted reticulation; petiole stout, 1.5—3 cm. long, the upper part bordered by the decurrent margins of the blade. *Flowers* in umbellules on slender glabrous 4—6 mm. long peduncles in slender axillary racemes 2—5 cm. long; rhachis glabrous, angular, nearly black; involucral bracts 4, very minutely puberulous or glabrous; flowers in each umbellule (\varnothing only) 5, pedicels villous, 1 mm. long; perianth-tube villous without, glabrous within except at the mouth; lobes variable, usually oblong, obtuse, slightly villous without, glabrous within, 1 mm. long. *Stamens* of σ flowers not seen. *Staminodes* of \varnothing flowers 12, the 6 outer clavate with slightly villous filaments, the 6 inner subulate rounded or acute at apex, with a pair of large ovate glands at the base. *Ovary* ovoid; style thick, curved then straight; stigma peltate, 3-lobed. *Fruit* ovoid at first, afterwards globose, 15—18 mm. in diam., the base enclosed in the rugose sulcate enlarged perianth-tube, at first cup-shaped, afterwards flattened, 12 mm. high including the somewhat flattened peduncle 15 mm. in diameter, the margin undulate; pericarp spotted when fresh, rugose when dry.

PERAK : at Kotah and Simpang, *Wray* 2409!, 3019!; in dense jungle on low ground, *King's Collector* 6689!. MALACCA : at Merliman, *Ridley* 5845!.—DISTRIB. Bangka (*Teysmann*)!; Borneo at Sarawak (*Beccari* 1649!, 4061!).

The specimens *King's Collector* 6689 and *Beccari* 4061 have usually thicker and broader and more obtuse even emarginate leaves, but the fruits are identical with the rest and some of the leaves are acute, and it does not seem to me expedient to propose a variety.

40. *LITSEA MACHILIFOLIA*, Gamble in Kew Bull. 320 (1910). An evergreen tree, reaching 12 to 24 m. in height and about 40—50 cm. in diam. of stem; branchlets slender, dark grey to nearly black when dry; leaf-buds linear, minutely grey-puberulous. *Leaves* coriaceous, alternate; oblong-lanceolate, long acuminate at apex, acute or cuneate often unequally at base; upper surface shining, glabrous, lower glaucescent when young, very minutely puberulous; margins slightly recurved; 10—20 cm. long, 3—7 cm. broad; midrib slender, slightly raised above, more so beneath; main nerves obscure, 10—15 pairs, immersed, at about 60° with the midrib and curving upwards to join near the margin in faint loops; transverse nervules few, very faint and irregular, enclosing the minutely areolate reticulation; petiole slender, black when dry, 1—2 cm. long. *Flowers* in umbellules on slender peduncles 4—5 mm. long, in slender paniculate glabrous axillary or subterminal often leafy racemes, the racemes 7—9 cm. long in ♂, 3—5 cm. in ♀; rhachis angular, black; raceme bracts small, ovate, caducous; umbellules when open 8 mm. broad in ♂, 6 mm. in ♀; involucre bracts 4, sometimes 5, orbicular, glabrous, the inner slightly fimbriate or lobed; flowers in each involucre 5, very small; pedicels about 1 mm. long, very slightly villous; perianth-tube in ♀ 1—1.5 mm. long, glabrous within except a few hairs at the mouth; lobes 6—8, very variable in size and shape, those of ♂ up to 2 mm. long, of ♀ to 1 mm., often lobed or ciliate, prominently gland-dotted. *Stamens* in ♂ flowers 9—13, usually 12, glabrous, those of outer rows 2—3 mm. long with ovate anthers, those of inner rows shorter with a pair of large shortly stipitate glands, a third above the base of the filaments; rudimentary ovary ovoid; style slender; stigma cleft. *Staminodes* of ♀ flowers 12—14, normally 12, those of the outer rows clavate acuminate, and 1 mm. long, those of inner rows subulate with a pair of sessile not very large glands at their middle. *Ovary* ovoid, glabrous; style thick, curved; stigma capitate. *Fruit* globose, 10 mm. in diam., half sunk in the hemispheric enlarged

perianth tube about 8 mm. high and 12 mm. in diam. at the mouth, margin smooth; enlarged pedicel clavate, flattened, 10—12 mm. long; pericarp smooth, yellowish.

PENANG: Moniot's road at 300 m. alt., *Curtis* 795!. PERAK: *Scortechini*! SINGAPORE: garden jungle, *Ridley* 4706!, 3458!.

Var. *angustifolia*, Gamble. *Branchlets* grey. *Leaves* usually smaller and narrower, 2.5—5 cm. broad; panicles much more branched. *Flowers* smaller; involucre and rhachis sometimes slightly puberulous especially in ♀; stamens usually 9; perianth-lobes with fewer and larger glandular dots. *Fruit* globose, 15—17 mm. in diam., seated on the rugose fleshy orange-coloured nearly flat enlarged perianth-tube, which is finally about 2 mm. thick and 15 mm. in diam.; enlarged pedicel much flattened and curved 14—20 mm. long; pericarp when fresh green and spotted, when dry yellowish and wrinkled.

PERAK: Gunong Batu Pateh, at 1000 to 1400 m. alt., *Wray* 416!, 985!, 1032!, 1108!; at Gunong Haram, *Scortechini* 326!, 588!; on low ground and hills up to 250 m. alt. at Larut and Gopong, *King's Collector* 3561!, 6113!, 6815!. SELANGOR: at Bukit Kutu at 900 m. alt., *Ridley* 7633!. MALACCA: at Brisu, *Derry* 653!. SINGAPORE: at Bukit Mandai, *Ridley* 6739!; *King's Collector* 1236!.

The available specimens show the fruits of the *species* not quite ripe, so the cupule may possibly flatten out as it does in the *variety*. *Wray* says that the flowers have the scent of the garden "Syringa" (*Philadelphus*.) *Scortechini's* specimens 328 have the rhachis of the inflorescence rather thicker and more puberulous.

41. LITSEA PANAMONJA, Hook. f. in Fl. Br. Ind. V. 175 (1886). A large evergreen tree, reaching 12 m. in height (*Curtis*) or more; branchlets moderately stout, greyish brown, with small lenticels and channels decurrent from below the leaf-bases, uppermost minutely grey-puberulous as are the lanceolate leaf-buds and the inflorescence. *Leaves* chartaceous, alternate; elliptic-oblong or oblong-lanceolate or -oblanceolate, acute or shortly acuminate at apex, acute at base, sometimes almost rounded; upper surface glabrous, olive-brown, lower paler, minutely grey-puberulous; 10—20 cm. long, 4—5 or even to 9 cm. broad; midrib slender, immersed or slightly impressed above, raised beneath; main nerves 10—14 pairs, slender, slightly impressed above, at an angle of about 55° with the midrib, curved upwards to and along the margin; transverse nerves obscure,

irregular and branched, enclosing an irregular reticulation; petiole rather slender, 1—2 cm. long, channelled above. *Flowers* in umbellules on rather stout peduncles 5—6 mm. long in grey-puberulous elongate often leafy racemes up to 17 cm. long in ♂, axillary to the upper leaves or the scars of fallen leaves; rhachis angled; raceme bracts small, ovate, very caducous; umbellules of ♂ when open 8 mm. in diam.; involucre bracts 4—5, the fifth when present ovate the rest orbicular concave, reflexed in flower; flowers in each umbellule 6; pedicels slender, 2 mm. long; perianth-lobes thin, variable in size and shape, usually oblong, acute or obtuse, villous without, glabrous within, gland-dotted, ciliate, 2·5—4 mm. long. *Stamens* in ♂ flowers 12, exsert, those of the outer rows 4 mm. long with oblong obtuse anthers and slender slightly villous filaments, those of the inner rows rather shorter with acute anthers and a pair of reniform lobed stipitate glands at the bases of the filaments; anther cells all introrse or the lower lateral; rudimentary ovary very small with slender style and bifid stigma. *Staminodes* of ♀ flowers and fruit not known. *Tetranthera Panamonja*, Ham. in Wall. Cat. 2553 A. B.; Nees in Wall. Pl. As. Rar. II. 67 and Syst. Laur. 561, 677; Meissn. in DC. Prodr. XV. 1. 197; Kurz For. Fl. II. 302.

PERAK: Waterloo new road, at 450 m. alt., *Curtis* 2694!.
MALACCA: at Hulu Chambong, *Derry* 1002!—DISTRIB. India, (Assam), Burma.

This seems to be var. *β longiracemosa*, Meissn. l. c.

42. *LITSEA CURTISII*, Gamble in Kew Bull. 363 (1910). A large evergreen tree with spreading branches reaching 24—30 m. in height and 60—90 cm. in diam.; branchlets rather stout, stiff, sharply angled, almost winged, black when dry; buds lanceolate, grey-puberulous. *Leaves* submembranous, alternate; elliptic or elliptic-obovate, rounded and very short acuminate, sometimes emarginate at apex, shortly attenuate and subcuneate at base; both surfaces glabrous, upper olive-brown to nearly black when dry, lower subglaucous; 15—26 cm. long, 6—11 cm. broad; midrib stout, broad, immersed above, raised beneath; main nerves 13—15 pairs, plane or slightly impressed above, slightly raised beneath, subparallel, starting at about 60° with the midrib, at first straight then curving to and along the midrib and breaking up in faint loops; transverse nervules distant, straight or slightly arched, very faint, enclosing the

minute but obscure reticulation; petiole rather thick, black when dry, straight, about 2—2.5 cm. long. *Flowers* in umbellules on peduncles about 6 mm. long, rather distantly arranged along the slender angular glabrous or slightly puberulous rachises of axillary or lateral or sometimes subterminal occasionally leafy racemes, reaching 10—25 cm. in length in ♂, barely 10 cm. in ♀; raceme-bracts minute, very caducous; umbellules ♂ when open 1 cm. broad, ♀ narrower; involucral bracts 4, glabrous or very minutely puberulous, orbicular, concave, spreading in flower; flowers in each umbellule 5—6; perianth-tube funnel-shaped, 2.5 mm. long, villous inside; lobes 6—9, unequal, membranous, nearly glabrous, usually obovate acute, 3.5 mm. long or less in ♀. *Stamens* of ♂ flowers 9 to 14 or perhaps more, normally (apparently) 9, glabrous; those of the outer rows about 4 mm. long with ovate often apiculate anthers and slender filaments, sometimes bearing glands at the base; those of the inner rows shorter with a pair of large more or less reniform lobed stipitate glands near the base; rudimentary ovary very small, ovoid, with minute style, enclosed in the perianth-tube. *Staminodes* of ♀ flowers 12—16, those of outer rows spatulate, gland-dotted, those of inner rows subulate with a pair of large sessile glands about halfway up. *Ovary* ovoid, glabrous; style very thick, curved; stigma peltate. *Fruit* not known.

PENANG: at cooly lines, Government Hill, at 360 m. alt., *Curtis* 2449!. PERAK: in dense jungle near Larut at 90—150 m. alt., *King's Collector* 6161!; *Scortechini* 162!.

48. *LITSEA NIDULARIS*, Gamble in Kew Bull. 365 (1910). A large evergreen tree reaching 25—30 m. in height and 90—120 cm. in diam. of stem; branchlets stout, pale brown, smooth, striate when dry, with prominent leaf-scars; buds ovate, acuminate, glabrous, 1 mm. long. *Leaves* coriaceous, alternate, glabrous; oblanceolate or elliptic-obovate, rounded and sometimes emarginate at apex, long cuneate, alternate or sometimes rounded at base; upper surface shining, lower bluish-green when fresh, reddish glaucescent when dry; margins much recurved; 10—25 cm. long, 4—10 cm. broad; midrib moderately stout, channelled above, much raised beneath; main nerves 10—12 pairs, impressed above, at from 50°—60° with the midrib, at once curved to and along the margin where they end in a faint series of loops; transverse nervules rather distant, straight or arched, often branched, enclosing the prominent minutely

areolate reticulation; petiole stout, 15—25 mm. long. *Flowers* in umbellules on slender glabrous peduncles up to 15 mm. long, distantly arranged in slender racemes about 10 cm. long in ♂, scarcely 4 cm. in ♀, axillary or lateral from above the scars of fallen leaves; umbellules when open 8—10 mm. in diam. in ♂, 5 mm. in ♀; involucre bracts 4, glabrous, orbicular, concave, reflexed in flower; flowers in each umbellule 4—5 on very short (2 mm.) pedicels; perianth-lobes 6—8 in ♂, 4—6 in ♀, oblong, acute or obtuse, sparsely villous, 3 mm. long. *Stamens* of ♂ flowers 12—16, normally 12, those of the outer rows 5 mm. long with subquadrate anthers and slender sparsely villous filaments; those of the inner rows shorter with obovate anthers and a pair of large lobed shortly stipitate glands near the bases of the filaments, lower anther-cells lateral; rudimentary ovary conical, glabrous, long, those of inner rows shorter thicker with a pair of large nearly orbicular stipitate glands at the base. *Ovary* ovoid; style rather thick; stigma large, peltate, lobed. *Fruit* waxy, deep yellow in colour, depressed globose, apiculate, 14 mm. in diam., 7—8 mm. high, almost included in the rather shallow nest-like cupule formed by the enlarged perianth-tube, the cupule rugose without, under 10 mm. high and 18—20 mm. in outer diameter, the margins incurved leaving an orifice 10—12 mm. in diameter; enlarged pedicel clavate, flattened, 1 cm. long; pericarp shining, smooth when dry.

PENANG: on Government Hill, 650 m., *Curtis* 3279! in herb. Penang. PERAK: in dense jungle near Larut at 250—300 m. alt., *King's Collector* 6885!; at Hulu Kenat, *Scortechini* 759!.

44. *LITSEA MEGACARPA*, Gamble in Kew Bull. 364 (1910). A large spreading evergreen tree reaching 18 to 24 m. in height and occasionally 30 or even 36 m., with a considerable diameter of stem; branchlets stout, brown, somewhat shining, with prominent leaf-scars and occasional lenticels, the uppermost angular, often nearly black when dry, glabrous as are the lanceolate buds. *Leaves* coriaceous, alternate, glabrous; elliptic-oblong, or -obovate, obtuse and apiculate rarely cuspidate at apex, attenuate at base for the lower two-thirds sometimes rounded, often unequal; upper surface dark green and glossy when fresh, shining olive-brown when dry, lower paler, cinereous when dry; margins slightly recurved; 15—45 cm. long, 7—20 cm. broad; midrib stout, immersed above, raised beneath; main nerves 10 to 15 pairs, rather distant, irregular,

slightly impressed above, starting at from 50° — 60° with the midrib and curving to and along the margin; transverse nervules obscure, distant, irregular and branched, enclosing the prominent minutely areolate reticulation; petiole stout, curved, 1.5—6 cm. long, channelled above. *Flowers* in umbellules on slender puberulous peduncles 5—20 mm. long, in slender axillary or lateral racemes reaching 10—15 cm. long in ♂, and 5—10 cm. in ♀, the rhachis angular, puberulous or glabrescent; raceme bracts minute, ovate, caducous; umbellules when open 10 mm. broad in ♂, 5 mm. in ♀; involucre bracts 4, orbicular, concave, puberulous without, the inner fimbriate on the margins; pedicels slender, silky-villous, 1—5 mm. long; flowers in each umbellule 4—5; perianth-tube funnel-shaped, 1—5 mm. long, villous; lobes 6, ovate acuminate, 2 mm. long, sparsely villous without, those of ♀ scarcely 1 mm. long. *Stamens* of ♂ flowers 9—12, usually 12, glabrous except at base, those of the outer rows 4 mm. long with oblong anthers and slender filaments, those of the inner rows shorter with a pair of large variously lobed sessile or stipitate glands from just above the base of the filaments; rudimentary ovary 0 or very small, conical with capitate stigma. *Staminodes* of ♀ flowers also 12, glabrous, those of the outer rows clavate 1.5 mm. long, those of the inner rows subulate 1 mm. long or less with a pair of large lobed glands as in ♂. *Ovary* ovoid; style thick, curved; stigma peltate, 2—3-lobed. *Fruit* large, globose, slightly depressed, about 2.5—3 cm. in diam., when very young almost enclosed in the enlarged turbinate perianth-tube cupule, later on about one-third enclosed in a cup-shaped cupule, finally scarcely 5 mm. high being at the base surrounded by the margins of a saucer-shaped cupule 2.5 mm. in diam. at the mouth and 7—10 mm. high, somewhat rugose without; enlarged pedicel thick, flattened, 15 mm. long; pericarp thick, bright red when fresh and often spotted, shining and yellowish when dry.

PROVINCE WELLESLEY: at Sungie Dhanu, *Curtis* 2511!. PERAK: at Sungie Larut and Tupai, *Wray* 2337!, 2730!; *Scortechini* 265!, 270!, 589!; in various localities about Larut up to 900 m. alt., *King's Collector* 3697!, 6076!, 6124!, 6155!, 6237!, 6409!, 6567!, 6613!, 6689!, 6774!, 6866!, 2704!. SELANGOR: at Dusun Tua, *Ridley* 7621!. SINGAPORE: at Toas, *Ridley* 6455!.

45. *LITSEA SEBIFERA*, Blume Bijdr. 560 (1825). A small tree reaching a height of 20 m. and with a diameter of stem of 42 cm.; bark ashy grey; branchlets very stout, brown, with prominent leaf-scars

and elliptic lenticels, uppermost angular, minutely puberulous; innovations silvery-silky. *Leaves* coriaceous, alternate; lanceolate or ovate-oblong or oblong-lanceolate, acute or obtuse and mucronate at apex, rather abruptly cuneate, often unequally, at base; upper surface glabrous, lower paler, when young silky-tomentose and silvery; 15—50 cm. long, 5—12 cm. broad; midrib very broad (up to 4 mm.) immersed above, much raised beneath; main nerves 14—20 pairs, slender, obscure above, not prominent beneath, starting at about 60° with the midrib and curving to and along the margin; transverse nervules few, distant, very obscure as is the reticulation; petiole stout, rugose, 1—2 cm. long, channelled above. *Flowers* in tomentose umbellules in axillary or lateral tawny-pubescent racemes 3—10 cm. long, the peduncles 2—5 mm. long; raceme bracts rather large, boat-shaped, 6 mm. long, very early caducous; umbellules when expanded about 1 cm. broad; involucre bracts 4, orbicular, concave, silky-tomentose without, glabrous within; flowers in each umbellule 5—7, sessile; perianth-tube short, grey-villous within, lobes usually 6, sometimes more, ovate acuminate, ciliolate, 3 mm. long. *Stamens* of ♂ flowers 12—16, those of the outer rows 5 mm. long with subquadrate anthers and grey-villous filaments, sometimes with glands at the base, those of the inner rows much shorter and with a pair of rather large oblong obtuse subsessile glands at the base; all the anthers introrse or the lower slightly lateral; ovary ovoid, glabrous, with short style and peltate stigma, ovule apparently fertile. *Staminodes* of ♀ flowers not seen. *Fruit* depressed-globose, 2—3 cm. diam., half-immersed in the very rough leathery obconic enlarged perianth-tube, 10—15 mm. high and 25—30 mm. in diam. at the acute mouth; enlarged pedicel stout, flattened, 10—15 mm. long; pericarp smooth, fleshy within; testa membranous; cotyledons very fleshy, much depressed, hemispheric, about 1 cm. high to 2 cm. broad. Koord. & Val. Bijdr. X. 140; Greshoff Nutt. Ind. Pl. 9 t. 3. *Lepidadenia Wightiana*, Nees Syst. Laur. 583; Wight Ic. 1837; Miq. Fl. Ind. Bat. I. 1. 933; Hook. f. Fl. Br. Ind. V. 180. *Cylicodaphne sebifera*, Bl. Mus. Bot. Lugd.-Bat. I. 388; Meissn. in DC. Prodr. XV. 1. 202. *Tetranthera calophylla*, Miq. Pl. Jungh. I. 183; Zoll. Verz. 114. *T. Roxburghii*, Hassk. Pl. Jav. 213 excl. syn.

MALAY PENINSULA: *D. T. Gwynne-Vaughan*, 397! at Bukit besar, 200 feet. SINGAPORE: Balestier road, *Goodenough* in Herb. Sing., Vern. "Malah."—DISTRIB. Java (*Zollinger* 317!, *Junghuhn* 760!, 761!; *De Vriese*, *Lobb*, *Kurz*); Borneo (*Ridley* 12429!).

Ridley writes that this plant is not really wild in Singapore, but was probably introduced from Java and planted by Javanese. Even in Java it is apparently only cultivated. Blume calls it a large tree, but I prefer to follow the latest authors, Koorders and Valetton, who describe it as small. The fruit is said to give a useful wax. The locality 'Nilghiri Hills' has been omitted, for the reasons given in the Fl. Br. Ind. Koorders and Valetton call it hermaphrodite and certainly flowers of Junghuhn 760, otherwise ♂ seem to have fertile ovules. The only fruiting specimen I have seen is that of Goodenough in the Singapore Herbarium: it has not the thick cupule of Greshoff's picture which may perhaps be badly drawn. I cannot help thinking that both *L. Garciae*, Vidal Revis. Pl. Vasc. Philipp. 228 (1886), and *L. griseola*, Elmer in Leaf. Philipp. Bot. II. 378 (1908), may belong to *L. sebifera*, Bl.

46. *LITSEA MAINGAYI*, Hook. f. in Fl. Br. Ind. V. 175 (1886). A large evergreen tree reaching 24—36 m. in height and 60—90 cm. in diam. of stem; branchlets stout, glabrous, blackish when dry, uppermost angular; buds lanceolate, grey-puberulous, as in the inflorescence. *Leaves* rigidly coriaceous, alternate, oblong or oblanceolate, obtuse acute or sometimes long acuminate at apex, attenuate and often unequal at base; both surfaces glabrous, upper shining, bullate, reddish brown when dry, lower paler; margins recurved; 16—40 cm. long, 5—13 cm. broad; midrib stout, plane above, raised beneath; main nerves 10—18 pairs, irregular, impressed above, prominently raised beneath, starting at 50°—60° with the midrib, at first straight, then curved to near the margin where they are connected in prominent loops; transverse nervules irregular, impressed above, often branched, enclosing the netted reticulation; petiole long, slender, 4—7 cm. long, black, thick at the base. *Flowers* in tomentose umbellules on peduncles 5—7 mm. long, rather distantly scattered along the rhachises of slender axillary or lateral drooping racemes up to 16 cm. long; raceme bracts boat-shaped, about 6 mm. long, very caducous, grey-puberulous; involueral bracts 4—5, coriaceous, orbicular, concave, grey-puberulous without, glabrous within; umbellules when open (♂) 10—12 cm. in diam.; flowers in each umbellule 6; perianth-tube funnel-shaped, hoary-villous on both sides, lobes 6—8 also hoary-villous without, irregular in shape, obtuse acute or acuminate, 3 mm. long. *Stamens* of ♂ flowers 12 or more, those of the outer rows 3—4 mm. long with oblong usually apiculate anthers and slender glabrous filaments, those of the inner rows much shorter, the anthers subquadrate apiculate, the filaments furnished with a pair of large usually angular glands at the base; upper anther cells introrse, lower lateral; rudimentary ovary sunk in the perianth-tube or 0. *Staminodes* of ♀ flowers and *Fruit* not known.

PERAK : in dense jungle on hills at 150—300 m. alt. near Larut, *King's Collector* 4737 !. MALACCA : *Maingay* K.D. 1264 !, 1273 !.

47. *LITSEA NORONHÆ*, Blume Bijdr. 56 (1825). A small ever-green tree reaching 12 m. in height and 20 cm. in diam. of stem, more usually a stout shrub 3—5 m. high; branchlets stout, with pale brown smooth bark, the uppermost with the lanceolate buds and innovations silky-puberulous. *Leaves* subcoriaceous, alternate; elliptic-oblong or obovate, obtuse or shortly apiculate at apex, cuneate or attenuate at base; upper surface when dry olive brown, dull, glabrous, lower grey- or reddish-glaucous, minutely puberulous or glabrous; 20—45 cm. long, 8—17 cm. broad; midrib moderately stout, slightly impressed above, much raised beneath; main nerves 10—16 pairs, impressed above raised beneath, rather irregular, starting at about 60° with the midrib, at first nearly straight, then curved to and along the margin and then joined by a series of decreasing loops; transverse nervules irregular, distant, branched, enclosing the rather largely areolate reticulation; petiole stout, curved, 1—4 cm. long, channelled above. *Flowers* in tomentose umbellules on peduncles 5—15 mm. long or longer, usually distantly arranged along slender tawny-pubescent racemes 5—20 cm. long the ♀ shorter than the ♂; racemes axillary or lateral or on older branchlets in the axils of fallen leaves; raceme bracts ovate or nearly orbicular and caducous; involucre bracts 5, orbicular, concave, 3-nerved, ciliate or the inner fimbriate, glabrous within, recurved in flower; flowers in each umbellule 5—6; pedicels 2—3 mm. long in ♂, 0 in ♀; perianth-tube 0 or very short in ♂, 2 mm. long in ♀, lobes oblong, obtuse or acute, nearly glabrous, variable in number (5—7) and shape, 3—5 mm. long in ♂, 2 mm. in ♀. *Stamens* in ♂ flowers variable in number, from 9—12, normally 9, those of the outer rows long exsert, 6 mm. long with obovate anthers and slender villous filaments sometimes glandular at base, those of the inner rows shorter, with smaller anthers and a pair of large glabrous lobed glands at the bases of the filaments; rudimentary ovary 0, or if present very small with capitate stigma. *Staminodes* of ♀ flowers also variable in number and arrangement, 9—12, normally 9, those of the outer rows slenderly clavate 1.5—2 mm. long with villous filaments, those of the inner rows short, 6 mm. long, subulate with a pair of large lobed glands as in ♂, usually flattened. *Ovary* ovoid, style much curved, thick; stigma thick, peltate, deeply lobed. *Fruit* (unripe) small, rounded, laterally compressed, broader

than long, apiculate, seated on but not immersed in the spreading enlarged obconic or cup-shaped perianth-tube about 15—20 mm. in diam. at mouth; pedicel thickened; pericarp red when ripe. Koord. & Val. Bijdr. X. 176. *Cylicodaphne noronhiana*, Blume in Mus. Bot. Lugd.-Bat. I. 380; Meissn. in DC. Prodr. XV. 1. 202. *C. rubra*, Blume l.c.; Meissn. l. c. *Lepidadenia noronhiana*, Miq. Fl. Ind. Bat. I. 1. 934. *L. rubra*, Miq. l. c. *Tetranthera rubra*, Nees Syst. 564. *Myristica Hookeriana*, Wall. Cat. 6802 ?

PERAK: in Upper Perak, Ulu Tupai, etc., Wray 2688!, 3477!, 3552!, 4246!; at Goping, Chandenang, etc., up to 250 m. alt., King's Collector 1087!, 5688!, 6443!, 7495!; at L. W. Rest House, Scortechini 742!, 1901!; at Kwala Depang, Curtis 3181!, 3319!. SELANGOR: Batu caves woods, Ridley 8197!. SINGAPORE: Wallich 6802 B! ?—DISTRIB. Java, Sumatra.

Koorders and Valetton specially mention that they find only 4 involueral bracts, 5 subsessile flowers, 4 perianth-lobes and 6 stamens or staminodes. I cannot understand this as I have examined many flowers and find always the flowers of *Cylicodaphne* as I have described them. The number of stamens varies much and sometimes the perianth-lobes are partly converted into stamens, but I have rarely seen so few as 6 though this occurs sometimes as in *Curtis* 3319 and in the var. described below. I fail to see the connection with *Tetradenia* suggested by Koorders and Valetton.

Var. hexandra, Gamble. Leaves more coriaceous, very obtuse at apex, rounded at base; midrib very broad; main nerves up to 20 pairs. Flowers in umbellules on longer (15—20 mm.) peduncles; perianth-lobes 4, stamens usually only 6.

SELANGOR: at Ginting Biday, Ridley 7620!.

48. LITSEA ROBUSTA, Blume Bijdr. 560 (1825). A large spreading evergreen tree reaching 24—30 m. in height and a considerable diameter, up to 90 cm.; branchlets stout, pale brown when dry with smooth bark, the uppermost much darker, angular, minutely grey-puberulous as are the lanceolate leaf-buds; branch buds large globose with many orbicular tawny-puberulous bracts. Leaves submembranous, alternate; elliptic-oblong or -oblanceolate, acute or acuminate at apex, attenuate and finally often rounded at base; upper surface glossy green when fresh, olive brown when dry, glabrous, lower paler and very minutely grey-puberulous, finally glabrous; margins slightly recurved; 20—50 cm. long, 8—18 cm. broad; midrib stout, immersed above, much raised beneath;

main nerves 18—21 pairs, fairly regular and parallel, slightly impressed above, those of narrower leaves starting at 50° — 60° , those of broader ones at 60° to even 80° with the midrib, only slightly curving till near the margin where they fade in small loops; secondary nerves between the main ones occasional; transverse nervules faint and usually branched, enclosing the very minute but obscure areolate reticulation; petiole stout, 3—4 cm. long, channelled above. *Flowers* in tomentose umbellules on short peduncles 5—7 mm. long in ♂, 4—5 in ♀, in slender racemes up to 18 cm. long in ♀, 6 cm. in ♂, from the axils of fallen leaves on the previous year's wood; rhachis angular, puberulous; raceme bracts ovate, very caducous; umbellules when open 10—12 mm. broad in ♂, slightly less in ♀; involucral bracts 4—6, the inner small, the outer orbicular, concave, rusty-grey puberulous without, at length reflexed; flowers in each umbellule 7; pedicels thick, short or 0, perianth tube thick, villous within, lobes 6, obovate, acute or obtuse, silky-villous without, glabrous within, 4—5 mm. long in ♂, less in ♀, lobes in ♀ early deciduous. *Stamens* in ♂ flowers 12, rarely more or less, those of the outer rows 5 mm. long with oblong anthers and slender slightly villous filaments sometimes mono-glandular, those of inner rows shorter and with a pair of large flattened sessile lobed glands near the bases of the filaments; upper anther-cells introrse, lower lateral; rudimentary ovary ovoid, with short glabrous style and lateral stigma. *Staminodes* of ♀ flowers usually 12, in the central flowers up to 15, those of outer rows oblong spathulate, glabrous, gland-dotted, 2.5 mm. long; those of inner rows subulate, villous behind, also 2.5 mm. long, with a pair of flattened oblong sessile glands near the base. *Ovary* ovoid, glabrous; style thick, curved; stigma capitate, reflexed, silky. *Fruit* depressed-globose, greenish-white, 15 mm. high, 25 mm. in diam., seated on the enlarged pustulate rough perianth-tube, which when quite young is nearly completely closed, when half ripe hemispheric, finally saucer-shaped and more or less spreading, 10 mm. high, 27 mm. in diam., the edges sharp; enlarged pedicel thick, flattened, curved, 20 mm. long; pericarp shining, rugose when dry. Koord. & Val. Bijdr. X. 163. *Tetranthera robusta*, Nees Syst. Laur. 564. *Lepidadenia robusta*, Miq. Fl. Ind. Bat. 1. i. 934. *Cylicodaphne robusta*, Blume Mus. Bot. Lugd.-Bat. II. 11.; Meissn. in DC. Prodr. XV. 1. 202. *Laurus grandis*, Wall. Cat. 2594 B. *Alseodaphne? costalis*, Nees in Wall. Pl. As. Rar. II. 72 and Syst. Laur. 185; Meissn. in DC. Prodr. XV. 1. 29; Hook. f. in Fl. Br. Ind. V. 146.

PERAK: in dense jungle on low hills at 90—150 m. elevation near Goping and Larut, *King's Collector* 5781!, 5878!, 6167!, 8266!. SELANGOR: at Gua Batu, *Ridley* 8529!. SINGAPORE: *Wallich* 2594b!.
DISTRIB. Burma (*Griffith* 4326!).

49. *LITSEA SARAWACENSIS*, Gamble in Kew Bull. 365 (1910). A small tree (?); branchlets slender, pale brown, glabrous, uppermost and buds only minutely tawny-puberulous. *Leaves* chartaceous, opposite and subopposite; elliptic -or oblong-lanceolate, cuspidate-acuminate at apex, acute at base; upper surface reddish-brown when dry, smooth but scarcely shining, glabrous, lower paler, also glabrous; 8—14 cm. long, 2—4 cm. broad; midrib slender; main nerves 5—7 pairs, oblique, curved upwards to near the margin, and meeting in prominent arched loops, slightly impressed above; transverse nervules horizontal, irregular, obscure as is the reticulation; petiole 5—6 mm. long. *Flowers* in peduncled (2—5 mm., very slender) umbellules in short axillary or lateral racemes of about 5 and scarcely 4 mm. long; umbellules in bud 3 mm. broad, with 4 orbicular nearly glabrous concave involucre bracts about 2 mm. in diam.; flowers in each umbellule 5, sessile in bud; perianth-tube short, densely villous within, lobes 6, ovate, subacute, ciliate, 1.5 mm. long. *Stamens* of ♂ flowers (in bud only) 9, those of the 2 outer rows as long as the perianth-lobes and with slender slightly villous filaments, those of the inner row much shorter, with smaller anthers and with 2 large sessile glands near the base which is surrounded with villous hairs; rudimentary ovary very small or 0. *Staminodes* of ♀ flowers not seen. *Fruit* (immature) ovoid apiculate, seated on the obconic enlarged perianth-tube which is glabrous and smooth at the margins, the lobes deciduous; pericarp smooth, black when dry.

SINGAPORE: in reservoir woods, *Ridley* 4817!.—DISTRIB. Borneo, Sarawak, *Beccari* 905!, 1475!, 1708!, 1796!; near Kuching, *Haviland* 3077!, 3646!.

50. *LITSEA LANCIFOLIA*, Hook. f. in Fl. Br. Ind. V. 159 (1886). A bush or small tree reaching 12 m. in height and 20—30 cm. in diam. of stem; branchlets slender, pale greyish-brown, uppermost and innovations grey- or rusty-tomentose; buds lanceolate. *Leaves* membranous or chartaceous, opposite or subopposite or rarely alternate; oblong, elliptic-oblong or lanceolate, acuminate often abruptly and sometimes obtusely at apex, often mucronate, cuneate attenuate

or sometimes more or less rounded at base; upper surface dull, glabrous, lower glaucous or cinereous, rusty-tomentose when young; 7—20 cm. long, 2—6 cm. broad; midrib slender, tomentose beneath, slightly channelled above; main nerves 8 to 12 pairs, curving rather obliquely upwards to and along the margin; transverse nervules faint and irregular as is the reticulation; petiole tomentose, short, 3—7 mm. long. *Flowers* yellowish, in peduncled (up to 5 mm.) umbellules in short axillary or lateral bracteate rusty-pubescent racemes of about 5 together; umbellules about 6 mm. broad with 4 orbicular concave involucre bracts 2—3 mm. in diam., spreading in flower; flowers in each umbellule 3, very small and very shortly pedicelled; perianth-tube very short both in ♂ and ♀ and densely long-villous within at mouth, lobes 6, ovate-oblong, acute, 3 mm. long, those of ♀ smaller. *Stamens* of ♂ flowers 9, those of the outer 2 rows eglandular with small quadrate anthers and slender villous filaments 3 mm. long; those of 3 inner shorter (2 mm.) and with a pair of large rounded sessile glands at the base; rudimentary ovary ovoid with short style and 2-lobed stigma. *Staminodes* of ♀ flowers also 9, those of 2 outer rows spatulate 1 mm. long, those of the inner row short conical with 2 large rounded sessile glands and tufts of long hairs. *Ovary* ovoid, glabrous; style rather thick, bent; stigma large, peltate, lobed, all together 2—3 mm. long. *Fruit* ellipsoid, apiculate, 10 mm. long, 5 mm. in diam., seated on the slightly enlarged (4 mm. in diam., 2 mm. high) but not hardened perianth-tube which is more or less crowned with the remains of the perianth-lobes and staminodes; pericarp smooth; pedicels thickened and elongated to 3—4 mm. Prain Beng. Plants 902. *Tetranthera lancifolia*, Roxb. ex Wall. Cat. 2532; Nees in Wall. Pl. As. Rar. II. 65 and Syst. Laur. 509; Meissn. in DC. Prodr. XV. 1. 194; Miq. Fl. Ind. Bat. I. 944; Kurz For. Fl. II. 300. *T. chrysantha* and *T. pusilla*, Bl. Mus. Bot. Lugd.-Bat. I. 376. *T. attenuata*, Wall. Cat. 2534 in part.

PERAK: at Relan Tujur, Tapu and other places, Wray 996!, 1306!, 2610!, 2895!, 3438!; King's Collector 2963!, 3233!, 3254!, 3351!, 6609!, 10526!, 10533!. SELANGOR: at Kwala Lumpur, Curtis 2401!. JOHORE: at Jaffaria, G. King!. SINGAPORE: at Selitar, Ridley 6454!; at Bukit Payang, Ridley 12563!.—DISTRIB. India (E. Himalaya, Assam, Khasia Hills and Sylhet), Burma, Sumatra, Borneo.

Var. *rufa*, Gamble. *Leaves* smaller, narrower, more tomentose; fruit nearly globose.

PERAK: *King's Collector* 7789!, 8807!, 10113!.

In my opinion this variety hardly differs from *L. fulva*, Boerl. = *Tetranthera fulva*, Blume.

51. *LITSEA GRACILIPES*, Hook. f. in Fl. Br. Ind. V. 159 (1886). A small evergreen tree reaching a height of 15 to 20 m. and 40—50 cm. in diam. of stem; branchlets slender, grey, uppermost nearly black, glabrous or minutely puberulous; leaf-buds lanceolate, grey-puberulous. *Leaves* pergamaceous, opposite or subopposite; elliptic or elliptic-oblong or -oblanceolate, acute or shortly acuminate at apex, sometimes mucronate, cuneate at base or sometimes almost rounded; upper surface pale olive-brown, glabrous, lower grey, glabrous or when young slightly puberulous especially along the nerves; 10—16 cm. long, 3—6 cm. broad; midrib slender, slightly impressed above; main nerves 6—8 pairs, faint, distant, leaving the midrib at about 60° and curved to and along the margin; transverse nervules few, obscure as is the reticulation; petiole thick, 8—15 mm. long, black. *Flowers* in umbellules on slender puberulous pedicels up to 15 mm. long, in axillary or lateral very short (5 mm.) racemes of about 1—10; involucre bracts 4, orbicular, concave, rusty-puberulous without, glabrous within, the margins ciliate or the inner fimbriate, reflexed in flower; umbellules in ♂ 8 mm. in diam. in flower, in ♀ 5 mm.; flowers in each umbellule 3—4 on short pedicels; perianth-lobes 6, densely silky villous without, ovate-acute or oblong-obtuse, 2-3 mm. long in ♂, 2 mm. in ♀, gland-dotted. *Stamens* of ♂ flowers 9—12, normally 12, those of the outer rows long exsert, 5 mm. long with oblong anthers and slender slightly villous filaments, those of inner rows shorter and with a pair of reniform stipitate glands from the bases of the filaments; rudimentary ovary 0 or very small, conical, glabrous. *Staminodes* of ♀ flowers 12, those of the outer rows clavate-spathulate 1—1.5 mm. long, those of the inner rows clavate with a pair of large glands at the base. *Ovary* ovoid; style thick, curved; stigma peltate 2—3-lobed. *Fruit* cylindric-oblong, obtuse at apex, 15—17 mm. long, 6—7 mm. in diam., seated on the obconic enlarged perianth 7 mm. long with pedicel and 7 mm. in diam. at mouth; pericarp glossy green spotted with white (Kunstler), yellowish and smooth when dry; testa crustaceous; cotyledons semi-cylindric.

PERAK: at Thaipeng, *Wray* 2101!; on low ground near Larut, *King's Collector*, 5421!, 5455!. MALACCA: *Griffith* K.D. 4311!.

JOHORE: at Tanjong Kupang, *Ridley* 6457!.—DISTRIB. Borneo (*Haviland* 3327!, *Kurz*! 3329!).

52. *LITSEA UJONGENSIS*, Gamble in Kew Bull. 366 (1910). An evergreen shrub or small tree reaching 6 to 9 m. in height; branchlets rather slender, densely rusty-tomentose. *Leaves* membranous to chartaceous, opposite or subopposite; oblanceolate, rather abruptly cuspidate acuminate at apex, cuneate or attenuate at base which is slightly rounded; upper surface shining, glabrous except the tomentose midrib and nerves, lower surface rusty-tomentose on the nerves and nervules, minutely grey-pubescent between them; 12–22 cm. long, 5–7 cm. broad; midrib slightly raised above, more so beneath; main nerves 10–15 pairs, slender, curving upwards to near the margin; transverse nervules irregular, obscure, as is the reticulation; petiole rather stout, short, rusty-tomentose 5–8 mm. long. *Flowers* in nearly sessile umbellules in very short 2–3-flowered axillary fascicles; perianth-lobes in ♀ about 1 mm. long villous outside prominently gland-dotted, more or less persistent in fruit as are the linear glabrous staminodes, the outer ones 1.5 mm. long, the inner three 1 mm. long with a pair of large glands at their base; ♂ flowers unknown. *Fruit* ellipsoid, 10 mm. long 8 mm. in diameter, seated on the disciform enlarged perianth-tube 4–5 mm. in diam. and 3–4 mm. high including the enlarged villous pedicel; style and stigma more or less persistent; pericarp crustaceous, black when dry.

NEGRI SEMBILAN: Sungei Ujong, *Ridley's Collectors* 1904!, 1942!, 2305!, 2316!, 5846!. MALACCA: at Gunong Sedang, etc., *Ridley*, 3172!, 5848!; all in Herb. Singap.

Var. *nervosa*, Gamble. *Leaves* subsessile, thickly pubescent, especially on the nerves, rounded at base; the nerves, transverse nervules and reticulation prominent. *Ovary* ovoid with long style and peltate 2-lobed stigma.

PEAK: at Gunong Batu Pateh, lower camp, *Wray* 1129!; *Scortechini* 2097!

53. *LITSEA SESSILIFLORA*, Hook. f. in Fl. Br. Ind. V. 160 (1886). A small tree; branchlets as thick as a goose-quill, the uppermost subquadrangular densely rusty-tomentose; buds ovoid, short. *Leaves* chartaceous, opposite, more or less bifarious; oblong-oblanceolate, obtuse at apex with a short acuminate point, cuneate or attenuate

at base; glabrous above, except the midrib which is slightly raised and tomentose, other nerves being deeply sunk, rusty-pubescent beneath; 15—30 cm. long, 4—10 cm. broad; midrib slender on upper, stout on lower, surface where very prominent; main nerves 16—20 pairs, impressed above, very prominently raised beneath, straight or not at first then curved to meet (all but the lowest) in prominent marginal loops; secondary nerves few, transverse nervules distant but prominent, as is also the reticulation; petiole very stout, tomentose, 5—15 mm. long. *Flowers* in densely tawny-pubescent umbellules sessile in the axils of the leaves or of fallen leaves, solitary or crowded, 6 mm. in diam. in ♂, ♀ smaller; involucre bracts 4, orbicular, concave, 4 mm. in diam. (♂), smaller in ♀; perianth-tube funnel-shaped, 2—3 mm. long; perianth-lobes 6, ovate, obtuse, broader in the ♂ than in the ♀. *Stamens* of ♂ flowers 9; those of the outer 2 rows eglandular, 2.5 mm. long, with elliptic obtuse anthers and slender villous filaments; those of the inner row shorter, 1.5 mm., with a pair of large nearly or quite sessile glands at the bases of the filaments; rudimentary ovary ovoid with thick style and small bifid stigma. *Staminodes* of ♀ flowers also 9; those of the 2 outer rows clavate villous 1.25 mm. long; those of the inner row spatulate, 1 mm. long, with a pair of large glabrous subsessile glands at the base. *Ovary* ovoid, glabrous; style thick, curved at top; stigma peltate, bifid. *Fruit* (young only) ovoid, at least 7 mm. long, apiculate, seated on the funnel-shaped enlarged perianth-tube which is 5 mm. broad at the mouth and carries the remains of the perianth-lobes and staminodes; pericarp thin, smooth.

PENANG: on Government Hill, *Maingay* K.D. 1511! and *Ridley* 7917!; in Moniot's road, *Curtis* 649!. JOHORE: at Gunong Taning, *Lake* and *Kelsall* 4085!.—DISTRIB. Sumatra; Borneo (*Beccari* 1545).

Beccari's specimens from Borneo have the leaves smaller and not so prominently marked by sunk nerves as the others, and they are more pubescent beneath, but the flowers (♀) agree. In *Maingay's* specimens the sunk nerves and nervules make a close imitation of the well-known 'crocodile skin' pattern.

54. *LITSEA FERRUGINEA*, Blume Bijdr. 561 (1825). A large tree reaching more than 30 m. in height and a considerable girth (9 m. diam.—*King's Collector*); upper branchlets thick, striate, angular, densely dark ferruginous-tomentose; buds ovoid with densely tomentose scales. *Leaves* coriaceous, alternate or sometimes subopposite, obovate or obovate-oblong, acute and mucronate at apex, cuneately

attenuate at base; upper surface shining, glabrous except the midrib, lower minutely dark ferruginous-tomentose, more so on the nerves; margins recurved; 10—18 cm. long, 4—7 cm. broad; midrib stout, impressed above, prominently raised beneath; main nerves 10—13 pairs, parallel, at about 40° with the midrib, curved in the upper part to and along the margin, impressed above, prominently raised beneath; transverse nervules sub-horizontal, obscure as is the reticulation; petiole stout, 10—15 mm. long. *Flowers* yellowish, without densely dark-tawny-tomentose, in peduncled (5—10 mm.) umbellules in short lateral racemes of about 5 and up to 5 mm. long; umbellules 7 mm. in diam., (σ) with 4 orbicular concave involucre bracts glabrous within; flowers in each umbellule about 7 very shortly pedicelled; perianth-tube short, lobes ovate-oblong, ciliate, 3-nerved, glandular, 3 mm. long. *Stamens* in σ flowers 12 in 4 rows, nearly or quite glabrous; those of the 2 outer rows with subquadrate anthers and slender filaments, 1.5 mm. long, eglandular; those of 2 inner rows similar but smaller and only 1 mm. long with a pair of oblong sessile glands near the tops of the very short filaments; rudimentary ovary ovoid with thick style and short stigma. *Staminodes* in η flowers also 12, glabrous, those of the outer rows spatulate, 1.25 mm. long; those of the inner rows 1 mm. long, subulate, with a pair of glands near the tops of the filaments. *Ovary* not seen. *Fruit* depressed-globose, 16 mm. in diam., 12 mm. long, when young nearly quite surrounded by the rugose cupule formed by the enlarged perianth-tube which opens out gradually and at length becomes a shallow rather thin patelliform cup under 5 mm. high and 1—2 cm. broad at mouth; pedicel obconic, rough, 5 mm. long; pericarp smooth, yellowish when dry. Koord. & Val. Bijdr. X. 179. *Cryptocarya ferruginea*, Bl. Cat. Hort. Bog. 65. *Tetranthera Blumei*, Nees in Wall. Pl. As. Rar. II. 65. *Actinodaphne Blumei*, Nees Syst. Laur. 598. *Lepidadenia ferruginea*, Miq. Fl. Ind. Bat. I. 1. 935. *Cylindrodaphne ferruginea*, Meissn. in DC. Prodr. XV. I. 207.

PERAK: Hills near Larut at 150—250 m. alt., etc., *King's Collector* 6039!, 6826!, 7546!, 8437!. SINGAPORE: at Selitar, *Ridley* 6151!.—DISTRIB. Java.

55. *LITSEA GRIFFITHII*, Gamble. An evergreen tree reaching 20 m. in height and 30—45 cm. in diam. of stem; branchlets stout, greyish-brown, somewhat angular, uppermost and innovations densely dark rusty-tomentose; buds leafy, with few deciduous scales. *Leaves* coriaceous, opposite or subopposite or rarely alternate; oblong

or elliptic-oblong, obtuse or obtusely acute at apex, cuneate or attenuate to almost rounded at base; upper surface shining, yellowish green, glabrous except on the midrib, minutely reticulate, lower surface densely light rusty-tomentose; margins recurved; 10—30 cm. long, 3—9 cm. broad; midrib flat or slightly impressed above, prominent beneath; main nerves 8—15 pairs, regular and regularly curved upwards to and along the margin, the uppermost joining in loops, faint and slightly impressed on the upper surface, densely tomentose and very prominent on the lower; transverse nervules arched; reticulation minutely areolate; petiole stout, 1—2.5 cm. long. *Flowers* yellowish or white, densely dark-tawny tomentose without, in peduncled (1—2 cm.) umbellules in short stout axillary or lateral racemes of about 5 and about 1 cm. long; umbellules 8—10 mm. in diam. (♂), 7 mm. broad (♀), with 4 orbicular or ovate concave involucre bracts, 5 mm. in diam. glabrous within; flowers in each umbellule 6—8, usually 7, very shortly pedicelled; perianth-tube funnel-shaped, 1.5 to 2 mm. long, lobes oblong ciliate, nearly glabrous within, 1—3-nerved, 4 mm. long in ♂, 2 mm. in ♀, 1.5 mm. or .5 mm. broad. *Stamens* in ♂ flowers 12, in 4 rows; those of the outer two rows with short quadrate anthers 1.5 mm. long, the filaments 4—5 mm. long, villous; those of the inner rows shorter, the anthers 1 mm. long, the filaments 2 mm. long, furnished above the base with a pair of large oblong truncate sessile glands; upper anther cells all introrse, lower all lateral; rudimentary ovary ovoid with thick straight style 2 mm. long and a bilobed papillose stigma. *Staminodes* of ♀ flowers 12, in 4 rows; those of the outer 2 rows spatulate, 1.5 mm. long; those of the inner two rows club-shaped, 1 mm. long, with a pair of large sessile glands attached above the base. *Ovary* ovoid; style very thick and fleshy, 3 mm. long; stigma peltate, 3—4-lobed and crenulate, the margins reflexed. *Fruit* ovoid, 2—2.5 cm. long and 13 mm. in diam., apiculate, half immersed in the hemispheric cup-shaped enlarged perianth-tube which is about 17 mm. high and as much in the diam. of the truncate sharply-edged mouth, prominently warted and very shortly pedicelled; pericarp smooth, wrinkled when dry. *L. Blumii*, Hook. f. in Fl. Br. Ind. V. 160, *non* Nees.

PERAK: at Changkat Jerin, *Wray* 2757!; at Ulu Bubong and near Larut at 90—180 m. alt., *King's Collector* 5865!, 8573!, 10167!. SELANGOR: in Weld's Hill Reserve, *A. Burn-Murdoch* 282 (*Ridley* 14284)!. MALACCA: *Griffith* K.D. 4285!; *Maingay* K.D. 1252!.

JOHORE: at Jaffaria, *G. King!*, *Hullett!*. SINGAPORE: Reservoir woods and garden jungle, *Ridley* 5823!, 5569!.—DISTRIB. Sumatra, in Lampongs, *H.O. Forbes* 1762!.

This is the plant described in Fl. Br. Ind. as *Litsea Blumii*, Nees, and identified from the Java specimens in Herb. Kew. Koorders and Valetton have, however, pointed out that *L. Blumii*, Nees = *L. ferruginea*, Blume, is a different plant and after examining many specimens I fully agree in their opinion, so that a new name has to be found for this species.

14. NEOLITSEA, Merr.

Evergreen trees. *Leaves* alternate, opposite, subopposite or verticillate, triple-nerved, usually areolate-reticulate, more or less lanceolate; buds perulate. *Flowers* dioecious, in sessile umbellules, in clusters or short racemes in the axils of upper leaves, or on the branchlets between the nodes, the clusters with small bracts at their bases; involucre bracts 4, deciduous; flowers in each umbellule 3–7, pedicels elongating; perianth-lobes 4. *Stamens* in ♂ flowers 6; those of the two outer rows eglandular, the 2 inner biglandular, anther-cells all introrse or the lower lateral. *Staminodes* of ♀ flowers 6, arranged as the stamens, usually linear or linear-clavate. *Ovary* ovoid, style thick; stigma usually peltate, in ♂ flowers 0 or rudimentary. *Fruit* a globose berry seated on the slightly enlarged disciform perianth-tube and somewhat elongate pedicel; pericarp smooth; cotyledons hemispheric.—DISTRIB. India and Malaya, one species or more extending to the Philippines and Australia: species about 30.

- | | |
|--|---------------------------|
| Leaves alternate | 1. <i>N. zeylanica</i> . |
| Leaves opposite subopposite or verticillate | |
| Leaves glaucous beneath, softly villous on the nerves and petioles and also on the upper branchlets and inflorescence | 2. <i>N. villosa</i> . |
| Leaves densely and softly rusty-villous on the under surface, on the nerves of the upper surface, on the branchlets and inflorescence .. | 3. <i>N. mollissima</i> . |
| Leaves glabrous except when young, very prominently areolate-reticulate | 4. <i>N. Kedahensis</i> . |

1. NEOLITSEA ZEYLANICA, Merrill in Philipp. Journ. Sc. I. Suppl. 57 (1906). An evergreen tree of variable character of foliage, flowers and fruit; branchlets slender, glabrous, greyish-brown, the uppermost sometimes minutely pubescent; innovations

golden-tawny-pubescent. *Leaves* coriaceous or subcoriaceous, alternate; elliptic or elliptic-ovate or -lanceolate, acuminate often abruptly at apex with obtuse points, acute or rounded at base; glabrous on both surfaces except sometimes when very young, the lower surface glaucous or not; margin usually recurved; 6—14 cm. long, 3—6 cm. broad; midrib slender, raised on both surfaces, side ribs from about 5—8 mm. above the base, curving upwards to disappear halfway up or a little higher; main nerves irregular, 2—5 pairs, obscure as are the arched transverse nervules; reticulation areolate, sometimes prominently, more usually only under the lens; petiole slender, 1—2 cm. long, curved. *Flowers* in sessile umbellules, in short axillary or lateral (on internodes of upper branchlets) fascicles or racemes up to 10 mm. in length, the raceme bracts orbicular, ciliate; umbellule buds globose, minutely tawny-puberulous or glabrescent, 3—5 mm. in diam.; involucre bracts 4, the 2 outer orbicular, concave, the 2 inner more or less obovate; flowers in each umbellule 3 to 5 or even to 7, on silky-villous pedicels finally reaching 5 mm. long in ♂, or 1.5 mm. in ♀; perianth lobes oblong, obtuse or acute, gland-dotted, sparsely villous outside, about 3 mm. long. *Stamens* in ♂ flowers 6, exsert; those of the outer rows with small subquadrate anthers and slender filaments which are glabrous or slightly villous, 4—5 mm. long; those of the inner row similar but shorter, and with a pair of large reniform emarginate stipitate glands about half-way up the filaments (at base in bud!); rudimentary ovary 0 or very small with slender style. *Staminodes* of ♀ flowers also 6; those of the outer rows linear villous, 2 mm. long; those of the inner row linear-clavate, 1.5 mm. long, with a pair of large reniform or cordate glands at their bases. *Ovary* ovoid, glabrous; style stout, twisted; stigma large, lateral. *Fruit* globose, 8 to 15 mm. in diam., seated on the disciform enlarged perianth tube, the disk 4 mm. in diam., crenate on the margins, the lobes quite deciduous; enlarged pedicel clavate, 5—7 mm. long; pericarp smooth, shining; cotyledons hemispheric. *Tetradenia zeylanica*, Nees in Wall. Pl. As. Rar. II. 64 and III. 30. *T. foliosa*, Nees and *T. furfuracea*, Nees l.c. *Tetranthera foliosa*, *pulcherrima* (in part) and *furfuracea*, Wall. Cat. 2563, 2567, 2568. *Litsea zeylanica*, C. and Fr. Nees in Amæn. Bot. Bonn. Fasc. I. 58 (1823) t. 5; Nees Syst. Laur. 626; Meissn. in DC. Prodr. XV. 1. 226; Blume Mus. Bot. Lugd.-Bat. I. 346, Wight Ic. tt. 132, 1844; Bedd. Fl. Sylv. t. 294; Dalz. and Gibs. Bomb. Fl. 223; Brandis For. Fl. 382 and Ind. Trees 540; Hook. f. Fl. Br. Ind. V. 178; Trimen Fl. Ceyl. III. 454; Benth. & von Muell. Fl. Austral.

V. 307; Cooke Bomb. Fl. II. 540; Prain Beng. Plants 902. *L. oblonga*, Nees Syst. Laur. 678; Wight Ic. t. 1845. *L. striolata*, Blume l.c. 347; Meissn. l.c. 223. *L. foliosa*, Nees l.c. 622; Blume l.c. 346; Meissn. l.c. 222 (excl. var. β .); Kurz For. Fl. II. 306. *L. furfuracea*, Nees l.c. 625; Blume l.c. 347; Miq. Fl. Ind. Bat. I. 975. *L. scrobiculata*, Meissn. l.c. 223. *L. trinervia*, Juss. in Dict. Sc. Nat. XXVII. 79. *Laurus Cassia*, Linn. ex Wight in Hook. Journ. Bot. II. (1840) 336. *L. involucrata*, Vahl in Herb. Juss. ex Lamk. Dict. III. 445; Roxb. Cor. Pl. II. 46, t. 187.

PENANG: *Wallich* 2568 b!; *Curtis* 443!, 468!; at Batu Feringgi, *Ridley*!. PROVINCE WELLESLEY: at Bukit Turu, *Ridley* 6956!. PERAK: *Scortechini* 1085!. MALACCA: on Mount Ophir, etc., *Griffith* 4331!; *Maingay* K.D., 1255!; at Brisu, *Holmberg* 759!. PAHANG: at Praman and Kwala Pahang, *Ridley*! (c.f. also *Ridley* in Trans. Linn. Soc. 2nd Ser. III. 341). SINGAPORE: *Wallich* 2568a!; at Changi, Pulau Ilbin and Bedoh, *Ridley* 3604a!, 4811!, 4819!, 8406!.—DISTRIB. India (in most hilly regions), Burma (Martaban Hills), Ceylon, Borneo (Mount Kinabalu at 2500 m., *Haviland* 1128! c.f. *Stapf* in Trans. Linn. Soc. 2nd Ser. IV. 220), Philippines Queensland.

2. NEOLITSEA VILLOSA, Gamble. An evergreen tree reaching 12—18 m. in height and 35—50 cm. in diam. of stem; branchlets moderately stout, grey, the uppermost densely grey-tawny puberulous; branch buds ovate, perulate, rusty puberulous, the scales obtuse; leaf-buds in ♀ trees smaller. *Leaves* coriaceous, opposite subopposite or subverticillate, the verticils usually of 5; lanceolate or oblong-lanceolate, long and sharply acuminate at apex, acuminate at base; upper surface glabrous, shining, olive-brown when dry, minutely areolate-reticulate, lower bluish-green when fresh, glaucous when dry, glabrous except the ribs and nerves which are softly rusty-villous; margins slightly undulate, recurved; 10—15 cm. long, 3—5 cm. broad; midrib rather slender, impressed above and keeled, raised beneath; side ribs from about 7 mm. above the base, oblique, impressed above, reaching to about half-way up and then ending in diminishing small loops which connect them with the lowest pair of nerves; nervules outside them 10 or more, looped; main nerves 3—5 pairs, prominent, sometimes branched, impressed above, oblique, joined by loops near the margin; transverse nervules many, arched, fairly prominent enclosing the areolate reticulation; petiole rather slender, twisted, pubescent, 10—12 mm. long, the upper part bordered by the decurrent margins of the blade. *Flowers*

in sessile umbellules in clusters of usually 4 to 6 on the upper branchlets between the nodes; umbellule buds globose, 5—6 mm. in diameter, closely grey-tawny pubescent; involucre bracts 4, orbicular, concave; flowers in each umbellule 4—5 (buds of ♂ only); perianth-lobes 4, oblong, densely silky-villous without, glabrous within. *Stamens* of ♂ flowers 6, the 4 of the outer rows with oblong anthers and slender filaments villous only at the base, the 2 of the inner row similar with a pair of large orbicular stipitate glands at the base; rudimentary (?) ovary ovoid; style curved; stigma capitate. *Staminodes* of ♀ flowers linear clavate. *Fruit* globose, 10 mm. in diam., seated on the flattened subquadrangular enlarged perianth-tube, villous within, 3 mm. in diam.; enlarged pedicel stout, 4—5 mm. long; pericarp bright red, wrinkled when dry. *Litsea villosa*, Blume Mus. Bot. Lugd-Bat. i. 349; Meissn. in DC. Prodr. XV. 1. 221.

PERAK: in dense forest on tops of high mountains in Larut at 1200—1400 m. alt., *King's Collector* 6979!, 7011!.—DISTRIB. Amboina, Philippine Islands.

3. NEOLITSEA MOLLISSIMA, Gamble in Kew Bull. 366 (1910) and 172 (1911). A small evergreen tree; branchlets moderately stout, rounded, grey, the uppermost softly and closely rusty-villous; leaf-buds ovate, perulate, densely villous. *Leaves* coriaceous, opposite subopposite or subverticillate, the verticils usually of 3; lanceolate, long acuminate at apex, acute at base; upper surface shining, olive-brown when dry, glabrous except the rusty-villous midrib; lower surface densely and softly rusty-villous, the nerves especially, greyish between the nerves; margins slightly recurved; 9—12 cm. long, 2.5—3.5 cm. broad; midrib stout, raised on the upper surface; side pair of ribs starting from about 5 mm. above the base and ending half-way up or a little further; main nerves 3—4 pairs, the pairs subopposite, very oblique, slightly impressed above, raised beneath; transverse nervules many, arched, obscure, enclosing the regular minutely areolate reticulation visible only with the lens; petiole stout, rusty-villous, 6—8 mm. long. *Flowers* in densely rusty-villous sessile umbellules, 1—3 together, axillary or on the branchlets between the upper nodes; involucre bracts very caducous; flowers in each umbellule apparently 5 (♀ only) on very short villous pedicels; perianth-tube densely long silky-villous within as are the 4 lanceolate perianthlobes. *Staminodes* of ♀ flowers 6; those of the two outer rows linear-clavate, 1.5—2 mm. long, sparsely villous, the inner pair

similar but shorter and with a pair of rather large cordate stipitate glands at their bases. *Ovary* ovoid; style densely villous; stigma capitate. *Stamens* of ♂ flowers and *fruit* not seen.

PERAK: at lower camp Gunong Batu Pateh at 1000 m. alt., Wray 931!

4. *NEOLITSEA KEDAHENSIS*, Gamble in Kew Bull. 367 (1910) and 172 (1911). An evergreen tree; branchlets slender, terete, uppermost in verticils, densely rusty-villous as are the leaf-buds. *Leaves* coriaceous, verticillate, prominently areolately pitted; elliptic-lanceolate, cuspidate-acuminate at apex, narrowed at base; upper surface glabrous except when young and then rusty-villous on the ribs and nerves, lower surface strigosely villous when young especially on the ribs and nerves and margin, afterwards glabrous; margin cartilaginous, recurved; 6—11 cm. long, 2—3.5 cm. broad; midrib slender, raised on both surfaces; side ribs slender, raised, starting at about 6 mm. above the base, ending a little above half-way in lessening slender loops which join the lower main nerves; main nerves 3—5 pairs, slender, curving obliquely to near the margin and there joining in slender loops; transverse nervules many, obscure, arched, enclosing the deeply pitted reticulation; petiole slender, 5—6 mm. long, pubescent when young. *Flowers* in sessile umbellules in dense axillary or lateral clusters supported by short obtuse bracts; involueral bracts 4, orbicular, concave, ciliate or fimbriate on the margins, 5—7-nerved, densely rusty-tomentose without, glabrous within; flowers in each umbellule 5, on short long-villous peduncles; perianth-lobes 4 (♂ only) ovate, obtuse or acuminate, densely villous, 1.5—2 mm. long. *Stamens* in ♂ flowers 6, the 4 outer with oblong anthers and slender glabrous filaments, the 2 inner shorter and with a pair of reniform stipitate glands at the bases of the filaments; rudimentary ovary ovoid, sparsely villous; style slender; stigma capitate. *Staminodes* of ♀ flowers and *fruit* unknown.

KEDAH: on Kedah Peak at 900 m. alt., Ridley 3590!, 5940!

Tribe VII. LAURÆÆ.

15. *LINDERA*, Thunb.

Shrubs or trees, often deciduous; *buds* naked or perulate. *Leaves* alternate or subopposite, penni-veined or 3—5-ribbed, chartaceous or coriaceous. *Flowers* diœcious, in pedunculate or sessile umbel-

lules, axillary or lateral on the branchlets; involucre bracts 2 to 4, concave, usually hemispheric; flowers in each umbellule 1 to 6 or more; pedicels long or short; perianth-tube very short, lobes 6 or more, usually unequal. *Stamens* in ♂ flowers normally 9 or 12, in three or four rows; those of the outer rows eglandular; those of the inner rows biglandular; anthers all introrse, 2- (or rarely 4-) celled, filaments usually slender; ovary 0 or rudimentary with rudimentary style and usually peltate stigma. *Staminodes* of ♀ flowers normally 9 or 12, also in three or four rows; those of the outer rows clavate eglandular; those of the inner rows clavate or subulate biglandular. *Ovary* ovoid; style usually thick; stigma peltate. *Fruit* globose or ovoid, seated on the usually slightly enlarged perianth-tube with usually persistent lobes; pedicel often thickened; pericarp succulent. *Seed* 1; testa thin, cotyledons conform to seed, usually hemispheric. —**DISTRIB.** About 60 species in tropical and Eastern Asia to Japan and in North America.

Leaves 1-ribbed, penninerved; flowers in each umbellule more than 9.

Leaves subcoriaceous, ovate, short-acuminate, upper surface olive-green when dry 1. *L. malaccensis*.

Leaves chartaceous, obovate, long-acuminate, upper surface blackish when dry 2. *L. Wrayi*.

Leaves subcoriaceous, lanceolate, acuminate; main nerves about 12 pairs 3. *L. oxyphylla*.

Leaves chartaceous, lanceolate, acuminate; main nerves 7—8 pairs 4. *L. polyantha*.

Leaves membranous, oblong-lanceolate, greyish; main nerves about 8—12 pairs 5. *L. pipericarpa*.

Leaves 3-ribbed, more or less penninerved on midrib; flowers in each umbellule 1—3.

Leaves chartaceous, over 6 cm. long.

Leaves long caudate-acuminate at apex; main nerves from midrib 1—3 pairs; flowers in each umbellule usually 1; perianth-lobes obtuse 6. *L. bibracteata*.

Leaves rarely caudate, usually acuminate at apex; main nerves from midrib 2—5 pairs; flowers in each umbellule 3; perianth-lobes acuminate 7. *L. caesia*.

Leaves coriaceous, usually under 6 cm. long; perianth-lobes obtuse 8. *L. rufo*.

1. *LINDERA MALACCENSIS*, Hook. f. in Fl. Br. Ind. V. 183 (1886). A tree reaching 15 to 25 m. in height and 40 to 60 cm. in

diam. of stem; branchlets dark brown to black, smooth, uppermost and lanceolate leaf-buds ferruginous-silky. *Leaves* subcoriaceous, alternate, glabrous or slightly puberulous, especially on the nerves, beneath; broadly ovate or elliptic-ovate, acuminate and often cuspidate at apex, rounded or sometimes acute at base; upper surface shining, olive-green when dry, lower dark reddish-brown; 7—17 cm. long, 4—9 cm. broad; midrib slender, raised on both surfaces; main nerves 5—7 pairs, slightly impressed above, the lowest 1—2 pairs from near the base, the rest more distant, all curving gradually and joining in loops a little distance from the margin; transverse nervules distant, irregular, the reticulation obscure; petiole slender, 1—2 cm. long, channelled above and near the top bordered by the decurrent margins of the blade. *Flowers* in pedunculate sparsely villous umbellules clustered in stout racemes in the axils of the leaves; racemes 1—6 mm. long; peduncles slender 8—15 mm. long, ♀ somewhat shorter than ♂; involucre bracts 4, the outer pair hemispheric, early deciduous; flowers in each umbellule 9 or more; pedicels slender, 1—3 mm. long; perianth-lobes 6, in ♂ obovate lobed, in ♀ oblong or spatulate, gland-dotted, 1—1.5 mm. long. *Stamens* of ♂ flowers 9, very small; those of 1st and 2nd rows glandular with glabrous filaments; those of 3rd row bearing a pair of rather large glands a little above the bases of the filaments; rudimentary ovary 0 or very small, conoidal. *Staminodes* of ♀ flowers also 9; those of rows I and II linear clavate; those of row III clavate with large glands as in ♂. *Ovary* ovoid, glabrous; style thick, curved; stigma peltate, lobed. *Fruit* a globose or ovoid drupe 6—20 mm. long, 6—15 mm. in diameter; pericarp smooth; fruiting pedicels thickened, 3—10 mm. long, surmounted by the scarcely enlarged perianth; fruiting peduncle also thickened, 15—20 mm. long.

PERAK: at Relan Tujur, Wray 3133!; *Scortechini*!; about Goping and Larut, King's Collector 873!, 963!, 2533!, 5139!, 5167!, 5578!, 5679!, 8839!. MALACCA: Griffith 4297!; Maingay K.D. 1257!, 1272!; at Sungei Udang, Holmberg 778!. JOHORE: at Batu Pahat, Ridley 11030!. SINGAPORE: at Bukit Timah, Choa Chu Kang and Turong, Ridley 3459!, 5998!, 10776!.

Scortechini's specimens, as also Ridley 3373! from Selitar and 4704! from Dalvey road, Singapore, have thinner less acuminate and less shining leaves, fewer flowers in the clusters and lighter coloured branchlets, but otherwise seem to belong to this species, and are scarcely worthy of being classed as a variety. Griffith 4297 is the ♀ plant of a stiff reddish brown form with long-

pedunculate umbellules. It may prove to be a separate species, when ♂ flowers and fruit are known.

I believe this species to be identical with *Lindera lucida*, Boerl. Handb. Fl. Ned. Ind. III. 147; Koord. & Val. Bijdr. X. 238, etc. I have spent some time over the question, which must have previously been considered by the author of the Fl. Br. Ind., and in deference to him I leave '*malaccensis*' as the specific name, though I fear that it may have to give way to '*lucida*.'

2. *LINDERA WRAYI*, Gamble in Kew Bull. 367 (1910). A small tree; branchlets moderately stout, smooth, black when dry; innovations and lanceolate leaf-buds ferruginous-puberulous. *Leaves* chartaceous or almost membranous, alternate; obovate or elliptic-obovate, or -oblanceolate, long cuspidate-acuminate at apex, occasionally rounded or even emarginate, long-cuneate-acuminate at base; both surfaces glabrous, the upper nearly black when dry, somewhat bullate, the lower reddish; 10—18 cm. long, 3—6 cm. broad; midrib slender, slightly impressed; main nerves 8—14 pairs, impressed above, curved upwards to join in loops near the margin; transverse nervules prominent beneath, regular, arched; reticulation obscure; petiole slender, 8—18 mm. long. *Flowers* in umbellules on slender glabrous peduncles 5—7 mm. long in short axillary or lateral racemes about 7 mm. long; involucre bracts 4, hemispheric, glabrous, deciduous; flowers in each umbellule (♂) about 7, (♀) about 8; pedicels very short; perianth-lobes ovate acute, often lobed, 1—2 mm. long, smaller in ♀ than in ♂, glabrous. *Stamens* in ♂ flowers 9, slender, glabrous, 2 mm. long; those of 1st and 2nd rows with slender filaments and obtuse anthers; those of 3rd row similar but less obtuse and with a pair of large angular glands a little above the bases of the filaments; rudimentary ovary small, conoidal. *Staminodes* of ♀ flowers 9, very minute; those of 1st and 2nd rows linear clavate, glabrous; those of 3rd row subulate with a pair of large angular glands about the middle of the filaments. *Ovary* ovoid; style long, thick, curved; stigma peltate, lobed. *Fruit* (immature) an ovoid drupe 7—10 mm. long on a much thickened pedicel, pericarp smooth.

PERAK: on Gunong Batu Pateh 1300 m. alt., on Gunong Brumber and Gunong Iras, 1500 m. alt., Gunong Bubu, 2000 m. alt., Wray 399!, 1564!, 3866!, 4149!; at Bujong Malacca, Ridley 9706!; *Scortechini*!.

Scortechini's specimens and Wray 399 have thinner more reddish leaves than the others, but I see no reason to separate them. Wray 1564 is a

specimen with rounded or emarginate leaves, but this is probably due to insect action or browsing when young.

3. *LINDERA OXYPHYLLA*, Hook. f. in Fl. Br. Ind. V. 183 (1886). A tree reaching 9—12 m. in height (Curtis); branchlets stout, blackish grey, the younger ones black when dry and smooth, glabrous except the innovations; leaf-buds lanceolate, ferruginous-pubescent. *Leaves* subcoriaceous, alternate; lanceolate or elliptic-lanceolate, acuminate at apex, cuneate at base; the upper surfaces nearly black when dry, glabrous, the lower subglaucous; 8—13 cm. long, 3—4 cm. broad; midrib rather slender; main nerves about 12 pairs, obscure, curving to the margin; secondary nerves few, between the main nerves; transverse nervules very few, obscure as is the reticulation; petiole black, channelled, 7—12 mm. long. *Flowers* in umbellules, on peduncles about 5 mm. long in short axillary and lateral ferruginous-pubescent racemes near the ends of the branchlets, 10—12 mm. long; involucral bracts 4, hemispheric, 4 mm. long, deciduous; flowers in each umbellule about 9—10; pedicels stout, short; perianth-lobes obovate-spathulate. *Stamens* of ♂ flowers 9; those of the 1st and 2nd rows on villous filaments 3 mm. long; those of the 3rd row with rather shorter filaments and 2 large reniform glands at their base, anthers ovoid 1 mm. long with large cells; rudimentary ovary small, conoidal. *Staminodes* of ♀ flowers and *fruit* not known. *Tetranthera oxyphylla*, Wall. Cat. 2547; Miq. Fl. Ind. Bat. I. 1. 957. *Daphnidium oxyphyllum*, Nees in Wall. Pl. As. Rar. II. 63 and Syst. Laur. 618. *Aperula oxyphylla*, Blume Mus. Bot. Lugd.-Bat. I. 366; Meissn. in DC. Prodr. XV. i. 240.

PENANG: *Wallich* 2547!; Government Hill at 750 m. alt., *Curtis* 1103!

4. *LINDERA POLYANTHA*, Boerl. Handl. Fl. Ned. Ind. III. 147 (1900). A moderate-sized tree; branchlets nearly black, angular, striate, the youngest ferruginous-puberulous as are the lanceolate naked leaf-buds and the inflorescence. *Leaves* chartaceous, alternate; lanceolate, acuminate at apex, acute, often unequally, at base; upper surface reddish-brown, glabrous, shining, the lower also reddish, often glaucescent; 9—11 cm. long, 3—4 cm. broad; midrib rather stout; main nerves 7—8 pairs, oblique, curved to the margin, somewhat raised on the upper surface; transverse nervules obscure as is the reticulation; petiole 10—15 mm. long, channelled, slender. *Flowers* in umbellules on peduncle 7—8 mm. long in short axillary

or lateral ferruginous-puberulous racemes 10—15 mm. long, the rhachis angular; involucral bracts 4, hemispheric, deciduous, densely ferruginous-puberulous; flowers in each umbellule about 12; pedicels short; perianth-lobes ovate-oblong, villous within, 1.5 mm. long. *Stamens* of ♂ flowers 9; those of 1st and 2nd rows ovate, acute, on villous filaments; those of 3rd row similar and with a pair of large glands near the base; rudimentary ovary small, glabrous, conoidal, the style short and stigma small. *Staminodes* of ♀ flowers not known. *Fruit* a globose berry, 8—10 mm. in diam., minutely apiculate; pericarp thin. Koord. & Val. Bijdr. X. 236. *Aperula polyantha*, Bl. Mus. Bot. Lugd.-Bat. 366, 367; Meissn. in DC. Prodr. XV. 1. 241. *Polyadenia polyantha*, Nees Syst. Laur. 577; Miq. Fl. Ind. Bat. I. 961. *Laurus polyantha*, Bl. Bijdr. 554.

PERAK: at Bujong Malacca, *Scortechini* 148!—DISTRIB. Java.

5. *LINDERA PIPERICARPA*, Boerl. Handl. Fl. Ned. Ind. III. 147 (1900). A small tree reaching 9—12 m. in height; branchlets slender, nearly black, uppermost puberulous. *Leaves* membranous, alternate; lanceolate or oblong-lanceolate, acuminate at apex, acute or rounded at base; upper surface shining, olive-green, glabrous except on the midrib, lower glaucescent, puberulous especially on the nerves; 6—15 cm. long, 2—4 cm. broad; midrib slender, black, pubescent; main nerves 8—12 pairs, curving outwards to join in loops near the margin; transverse nervules straight, fairly prominent; reticulation obscure; petiole slender, 1—2 cm. long. *Flowers* in umbellules on slender 5—10 mm. long peduncles in clusters or short grey-puberulous racemes, scarcely 1 cm. long, from the internodes of the branchlets; bracts grey-puberulous, deciduous; involucral bracts 4, semi-orbicular, concave, glabrous without, villous within, 2—3 mm. long, gland-dotted; flowers in each umbellule about 6; perianth-lobes ovate, obtuse, villous at the base within. *Stamens* of ♂ flowers 9 with 2-celled anthers; those of the 1st and 2nd rows 1 mm. long, with slender pubescent filaments; those of the 3rd row 1.5 mm. long, with a pair of rather large reniform glands about the middle of the filaments; rudimentary ovary small, conoidal. *Staminodes* of ♀ flowers not known. *Fruit* a globose berry, the size of a small pea (4—5 mm. in diam.) shortly beaked, black, seated on the slightly enlarged perianth-tube. *Aperula* ? *pipericarpa* Meissn. in DC. Prodr. XV. 1. 242. *Polyadenia pipericarpa*, Miq. Fl. Ind. Bat. I. 1. 962.

PERAK: *Scortechini* 290!; in rocky localities in forest at 900—1200 m. alt., *King's Collector* 6948!—DISTRIB. Sumatra.

6. *LINDERA BIBRACTEATA*, Boerl. Handl. Fl. Ned. Ind. III. 146 (1900). A slender shrub reaching 3 to 4.5 m. in height, or a small tree; branchlets very slender, terete, the uppermost and the lanceolate leaf-buds silkily tawny-villous. *Leaves* chartaceous, alternate; ovate- or elliptic-lanceolate, long and sharply caudate-acuminate at apex, acute or rounded at base; upper surface olive-brown, shining, glabrous except on the ribs; lower surface glaucescent, the ribs at the base very villous; 7—11 cm. long, 2 to 3.5 cm. broad; ribs 3, the midrib extending to the extreme tip of the acumen, the side ribs starting from about 2 mm. above the base, and extending to nearly two-thirds of the length of the leaf; main nerves 1 to 3 from the midrib above half its length, curving to the margin and joining in loops, outside the side ribs 10 or more short nerves arched near the margin; transverse nervules slender, prominent beneath, irregular, joined by a minutely areolate reticulation; petiole very slender, tawny-villous, 6—12 mm. long. *Flowers* in sessile umbellules in axillary clusters; involucral bracts 2 to 4, the outer if present often small, glabrous except the ciliate margins; flowers in each umbellule 1—3, usually 1; pedicels short, densely villous; perianth-lobes 6, oblong, obtuse, 2 mm. long, glabrous within, villous without, narrower and shorter and more acute in ♀. *Stamens* of ♂ flowers 9 or more, usually 9; those of the two outer rows with obtuse anthers and villous filaments; those of the inner rows rather longer but similar and with a pair of rather large glands a little above the bases of the filaments; rudimentary ovary ovoid with short style and peltate stigma. *Staminodes* of ♀ flowers also 9 to 12; those of the outer rows linear-clavate with villous filaments; those of the inner rows similar and with a pair of stipitate glands at the very base. *Ovary* ovoid, glabrous; style twisted; stigma capitate. *Fruit* a globose drupe up to about 1 cm. in diam.; enlarged perianth-tube scarcely any; pedicel clavate, 1 cm. long. Koord. & Val. Bijdr. X. 233. *Daphnidium bibracteatum*, Nees Syst. Laur. 615; Blume Mus Bot. Lugd.-Bat. I. 351; Meissn. in DC. Prodr. X. 1. 229. *D. acuminatum*, Blume l.c.; Meissn. l.c. *D. caesium*, Miq. Fl. Ind. Bat. I. 1. 976 *in part only*. *Laurus bibracteata*, Bl. Bijdr. 553. *L. acuminata*, and *L. microphylla*, Reinw.; Nees l.c. 611.

PERAK: on Maxwell's Hill, etc., up to 1200 m. alt., Wray 1193!, 2945!, 4162!; Larut at 450 to 600 m., King's Collector 2641!; *Scortechini* 640!; at Hermitage 900 m., Curtis 1332!; at Gunong Keladang, Ridley 9589!, at Taiping, Ridley 14515!.—DISTRIB. Java (Bantam, Forbes 354!)

Wray Nos. 1193, 4162 are fruiting specimens only and have rather smaller less acuminate leaves, not so glaucous beneath; so I am not quite sure of them.

7. *LINDERA CÆSIA*, Boerl. Handl. Fl. Ned. Ind. III 146 (1900). A small tree reaching 3 to 4.5 m. in height and a diameter of stem of 5 to 8 cm.; branchlets slender, dark brown, rather rough, the uppermost densely villous, the innovations silkily tawny-villous. *Leaves* chartaceous, alternate; elliptic-ovate or -lanceolate, long-acuminate at apex, rarely caudate, acute at base; upper surface smooth, glabrous except on the ribs, lower surface bluish green when fresh, glaucous when dry; 6—10 cm. long, 3—5 cm. broad; ribs 3, the midrib prominent, reaching the tip of the acumen, the side ribs starting from 4—5 mm. above the base, curving and ending in small loops about half-way up; main nerves from the midrib 2—5 pairs, prominent, joined near the margin by arching loops, nerves outside the side ribs about 6—8, short; transverse nervules irregular, branched and anastomosing; reticulation areolate; petiole 6—10 mm. long, slender, blackish-villous. *Flowers* in sessile umbellules in close axillary clusters; involucre bracts 2—3, if more than 2 the outer quite small, glabrescent without; flowers in each umbellule 3, sessile or on very short villous pedicels; perianth-lobes 6, lanceolate-acuminate, 1—2 mm. long, gland-dotted, villous without and at base within. *Stamens* of ♂ flowers 9 or 12; much longer than perianth-lobes, up to 5 mm., with oblong short anthers and slender villous filaments, those of the outer rows shorter than those of the inner, the inner with a pair of rounded rather small glands at the very bases of the filaments; rudimentary ovary ovoid with short curved style and large peltate stigma. *Staminodes* of ♀ flowers and fruit not known. *Daphnidium cæsium*, Nees in Mus. Bot. Lugd.-Bat. I. 351; Meissn. in DC. Prodr. XV. I. 229; Miq. Fl. Ind. Bat. I. 1. 976 (*in part only*).

PERAK: Maxwell's Hill, *Scortechini* 14!, 1200 m. alt., *Curtis* 2052!; dense forest near Larut at 1000—1200 m. alt., *King's Collector* 6951!. SELANGOR: at Sempang, *Ridley* 15597!.—DISTRIB. Java.

I believe and hope I am correct in the identification of this species from the Java specimens in the Calcutta Herbarium and from descriptions.

8. *LINDERA RUFA*, Gamble. A shrub reaching 2 m. in height; branchlets rather stout, rough, brown, uppermost ferruginous-villous as are the innovations; buds ovoid, perulate, the scales

obtuse. *Leaves* coriaceous, alternate; ovate or ovate-lanceolate, long acuminate at apex, acute at base; upper surface olive-brown when dry, shining or dull, glabrous except on the midrib, lower surface tawny-villous when young, glaucous when old, margins recurved; 4—7 cm. long, 2—3 cm. broad; ribs 3, midrib stout, produced to the tip of the acumen, impressed and usually villous above, side ribs from 4—5 mm. above the base, nearly straight, ending about half-way up; main nerves from the midrib 2—3 pairs, irregular, nerves outside side ribs 0 or few; transverse nervules very faint, reticulation areolate; petiole slender, tawny-villous, 10—15 mm. long. *Flowers* in umbellules, sessile or very shortly pedunculate in axillary tawny-villous clusters or racemes; involucre bracts 4, hemispherical, very much gland-dotted, glabrous within; flowers in each umbellule 1 to 3 on very short long-villous pedicels, perianth-lobes 6, unequal, ovate or ovate-oblong, 1.5—2 mm. long, gland-dotted, long-tawny-villous at base within as is the very short perianth-tube. *Stamens* of ♂ flowers usually 9, glabrous except at the base; those of the outer rows with shortly oblong anthers and slender filaments; those of the inner row similar and with a pair of large reniform stipitate glands at the base; rudimentary ovary ovoid, with short style and peltate stigma. *Staminodes* of ♀ flowers 9 to 12, clavate, those of outer rows longer than those of the inner which have glands at the base as in ♂. *Ovary* ovoid; style thick, twisted; stigma capitate, lobed. *Fruit* (immature) an ovoid drupe 6 mm. long, seated on the persistent perianth-lobes and staminodes; pedicel thickened and lengthened; pericarp shining. *Lindera cœsia*, Reinw. var. *rufa*, Stapf in Trans. Linn. Soc. 2nd Ser. IV. 220.

PERAK: Ulu Batang Padang 1500 m., Gunong Brumbu Pahang 2100 m. and Gunong Bubu 1500 m., *Wray* 1571!, 1581!, 3921!; *Scortechini*!; high rocks on Gunong Batu Pateh 900—1200 m. alt., *King's Collector* 8066!. SELANGOR: top of Ulu Semangko, *Ridley* 12060!.—DISTRIB. Borneo (Kinabalu 2500 m., *Haviland* 1106!); Sumatra (Mt. Dempo 2200 m., *Forbes* 2394!).

Tribe VIII. CASSYTHEAE.

16. CASSYTHA, Linn.

Filiform twining parasites, adhering to their host by suckers. *Leaves* consisting of minute scales or none. *Flowers* small, herma-

phrodite, sometimes dimorphic, spicate, capitate or racemose; bracteoles 3. *Perianth*-tube short and globose or turbinate and as long as the lobes; segments 6, the 3 outer smaller. Perfect *stamens* 9 or 6, 2-celled; those of the 1st row opposite the outer perianth-lobes, introrse, those of the 2nd row opposite the inner perianth-lobes, introrse, sometimes reduced to staminodes; those of the 3rd row opposite those of the 1st row, extrorse, the filaments with a pair of glands at the base; within these and opposite those of the 2nd row 3 sessile or stipitate staminodes. *Ovary* globose, free in flower but included in the perianth-tube, which closely covers it in fruit; style short; stigma subsessile, small or capitate. *Fruit* a drupe enclosed in the enlarged inflated perianth-tube which is crowned by the remains of the lobes and stamens; pericarp of two layers, the outer thin and smooth, the inner thick and hard. *Seed* conform to the drupe; testa thin; cotyledons fleshy, at length confluent.—*DISTRIB.* Species about 15, chiefly Australian, with a few S. African, one in Borneo and one widely distributed.

CASSYTHA FILIFORMIS, Linn. Sp. Pl. (1753) 35. *Stems* very long, cord-like, much twisted together, often branched, glabrous or pubescent, dark green. *Flowers* in lax or dense lateral spikes 1.5—5 cm. long; bracteoles small, rounded, ciliate; rachis puberulous. *Perianth*-tube turbinate, about 2 mm. long; lobes 6, the 3 outer very small, rounded, ciliate; the 3 inner oblong, concave, valvate. *Stamens* of the 1st row ovate, with broad filaments; those of the 2nd row with narrow filaments; those of the 3rd row triangular, with sessile rounded glands; staminodes of the 4th row triangular, acute, subsessile. *Fruit* a globose white drupe, 5—7 mm. in diameter with a hard pericarp enclosed in the fleshy enlarged perianth-tube which is crowned by its segments. Nees Syst. Laur. 642; Meissn. in DC. Prodr. XV. 1. 255; Wight Ic. t. 1647; Wall. Cat. 2608, 7534; Roxb. Fl. Ind. II. 314; Dalz. and Gibs. Bomb. Fl. 223; Griff. Notul. IV. 353; Hook. Fl. Exot. t. 167; Benth. Fl. Austral. V. 311; Trimen Fl. Ceyl. III. 555; Hook. fil. Fl. Br. Ind. V. 188; Prain Beng. Plants 904; Cooke Bomb. Fl. II. 541. 'Acatsjavalli' Rheede Hort. Mal. VII. t. 44.

MALAY PENINSULA: Gwynne-Vaughan 243!. PENANG: Wallich; Curtis 1203!. PERAK: King's Collector 4956!. PAHANG: at Rumpin river, Ridley!. MALACCA: Griffith 4238!; Harvey!; at Sungei Udang, Goodenough 1384!. SINGAPORE, Ridley 3380!.—*DISTRIB.* Throughout India, Ceylon, Arabia, Mascarene Islands, Malay Archipelago, Australia, Polynesia, Tropical Africa, America.

Family CIII. HERNANDIACEÆ.

Trees or climbing shrubs. *Leaves* alternate, simple or pinnate, entire, exstipulate. *Flowers* bisexual or monœcious or polygamous, regular, usually small, white or greenish. *Perianth* superior; segments free or shortly united below in two valvate 3—5-merous whorls or more rarely in one imbricate 4—8-merous whorl; stamens 3—5 in a single whorl; anthers 2-celled, dehiscing introrsely or laterally by 2 valves; staminodes more or less glandular, in 1 or 2 whorls outside the stamens or absent; those of the outer whorl in pairs at the base of the stamens, those of the inner whorl alternate with them. *Ovary* inferior, 1-celled; ovule solitary, pendulous, anatropous. *Fruit* dry, often longitudinally ribbed, sometimes with 2—4 longitudinal wings (*Illigera*) or with 2 terminal wings formed by accrescent perianth-segments (*Gyrocarpus*) or wingless and enclosed in an inflated cupule (*Hernandia*). *Seed* solitary, exalbuminous; embryo straight; cotyledons large, plano-convex, more or less lobed or flattened and spirally twisted. **DISTRIB.** About 35 species, tropical.

Leaves trifoliate; fruit with 2—4 broad lateral wings .. 1. *Illigera*.

Leaves simple or peltate; fruit ovoid, not winged but enclosed in the inflated cupule 2. *Hernandia*.

Leaves broadly ovate, usually lobed; fruit with two long wings formed by enlarged perianth-lobes 3. *Gyrocarpus*.

(1) *Illigera* and (3) *Gyrocarpus* have already been described under *Combretaceæ*, Journ. As. Soc. Beng. LXVI. II (1897), pp. 342-345. The genus *Illigera* has later been revised by S. T. Dunn in Journ. Linn. Soc. Bot. XXXVIII, 290, and the following species admitted as belonging to the Malay Peninsula.

1. *I. trifoliata*, Dunn = *I. appendiculata*, Kurz For. Fl. Burma I. 469 (non Blume); King in Journ. As. Soc. Beng. LXVI. II. 343.

2. *I. pulchra*, Blume Bijdr. 1153 = *I. lucida*, Teysm. & Binn.; King, l.c. 344.

2. *HERNANDIA*, Linn.

Evergreen trees. *Leaves* alternate, ovate or peltate, entire, 3—7-ribbed. *Flowers* monœcious, 3-nately involucrate at the ends of the branches of a lax panicle; each involucre with 3 flowers, the central one ♀ with a cupular involucre at the base of its peduncle, enclosing the ovary; the two lateral ones ♂, also shortly peduncled; bracts of the involucre 4—5, subvalvate in bud. *Perianth*-lobes subvalvate, those of the ♂ 3 to 6, those of the ♀ 4 to 8. *Stamens* as many as

and opposite to the outer perianth-lobes, the filaments with 1—2 glands or sometimes none at the base; anthers 2-celled, extrorsely or marginally dehiscent with longitudinal valves attached to the connective; staminodes in ♀ flowers usually 4. *Ovary* inferior, fleshy; style included in the tube, clavate at tip; stigma dilated, toothed or lobed. Fruit a drupe, enclosed in the enlarged inflated involucrel having a terminal circular orifice; pericarp ribbed or smooth, with a terminal umbilicus. *Seed* conform to the fruit, exalbuminous; testa thick, crustaceous, open at the apex opposite the radicle; cotyledons fleshy, hemispheric, lobed, ruminant; radicle short, superior.—**DISTRIB.** Species 8—12, in tropical regions of both worlds.

HERNANDIA PELTATA, Meissn. in DC. Prodr. XV. 1. 263 (1864). A tree; branchlets stout, smooth, marked with the scars of fallen leaves. *Leaves* rather coriaceous; broadly ovate, peltate, acute or obtuse at apex, rounded truncate or subcordate at base; margin entire, recurved; ribs 5—7 from the insertion of the petiole, usually 1—2 cm. above the base, all raised on the lower surface, nerves from the midrib about 5 pairs, about as many also from the innermost pair of ribs; reticulation prominent beneath; 10—20 cm. long, 7—15 cm. broad; petiole stout, terete, about 7 cm. long. *Panicles* 10—15 cm. long, corymbose, hoary-puberulous; bracts in pairs, ovate-spathulate, 3—5 mm. long; involucrel bracts 5—7 mm. long, oblong, obtuse; pedicels short; ♂ flower with 6, ♀ flower with 8 perianth-lobes about 5 mm. long; involucrel of ♀ flower cup-shaped, truncate. *Stamens* 3 each with 2 clavate glands at the bases of the filaments; staminodes of ♀ flower subglobose. *Fruit* an oblong 8—10-ribbed drupe 2 cm. long with a terminal rounded boss 5 mm. long, enclosed in the enlarged inflated lanceolate involucrel which is open at top in a circular orifice; pericarp leathery, smooth without. *Seed* globose, 1—5 cm. in diam; testa crustaceous, emarginate at apex; cotyledons fleshy, palmately lobed, ruminant. Kurz For. Fl. II, 309; Bedd. Fl. Sylv. Madr. t. 300; Benth. Fl. Austral. V. 314; Hook. f. in Fl. Br. Ind. V. 188; Trimen Fl. Ceyl. III. 456; Koord. & Val. Bijdr. VII, 108; Brandis Ind. Trees, 542. *H. sonora*, Linn. Sp. Pl. I. 981 *in part*; Bl. Bijdr. 550; Wight Ic. t. 1855; Wall. Cat. 7811; Miq. Fl. Ind. Bat. I. 1. 887.

DINDINGS: at Pangkore Laut at sea level, *Wray* 4252!; *Curtis* 3446!. **SINGAPORE**: *Wallich* 7811 D.!.—**DISTRIB.** Ceylon, Andamans, Malay Archipelago, N. Australia, Pacific Islands, E. Africa, Madagascar.